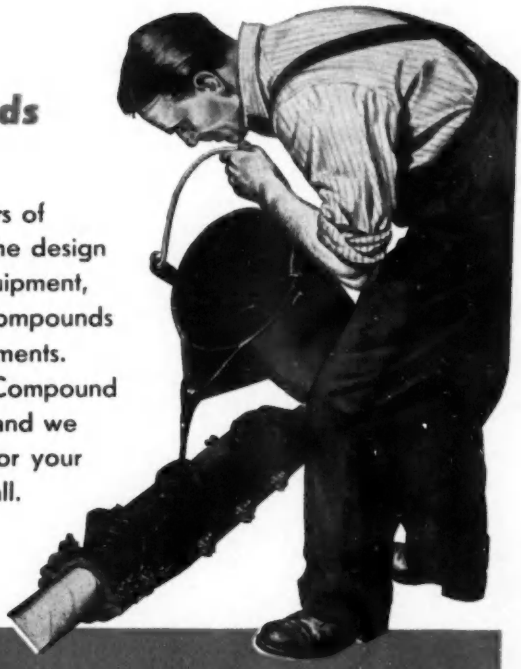
ELECTRICAL TIMES

THURSDAY
29 OCT.
1953
NINEPENCE

Use the right compounds

HENLEY'S, during fifty years of specialized experience in the design of electrical distribution equipment, have evolved a range of compounds to meet all jointing requirements. There's always a HENLEY Compound that's just right for the job and we shall be pleased to quote for your requirements—large or small.

Catalogue 57 gives full details.



Use **HENLEY**

REMEMBER POPPY DAY

INSULATING COMPOUNDS

for Electrical Distribution Equipment

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

Mechanical Applications of Paxolin
Paxolin laminates, used for a multitude of electrical applications, are also widely employed for mechanical purposes. The material is half the weight of aluminium but tough and easily machined and as it is supplied in a variety of grades the most exacting conditions can be met. Cams, drilling jigs, templates, and moulds can be fabricated from this versatile material as well as countless components for tools, clocks, instruments, and other devices. One special application is bearings. We have supplied not only small ones but some of massive proportions. We are also equipped for the production of very large moulded laminates such as door panels. Paxolin is well established in the mechanical as well as the electrical field.

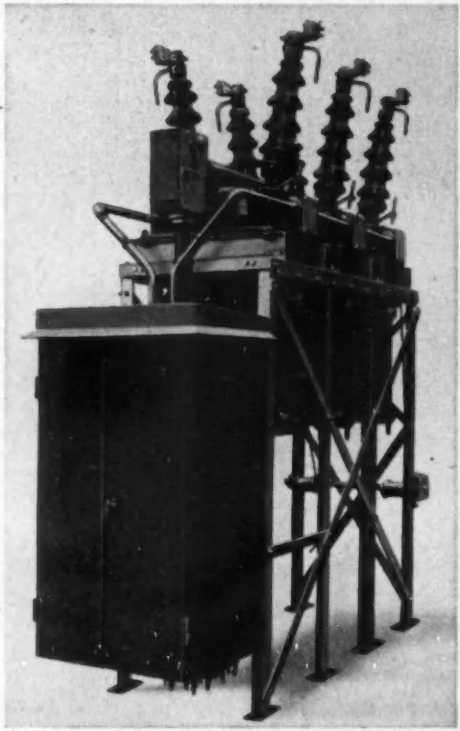
m and i

The Micanite & Insulators Co. Ltd.

EMPIRE WORKS · BLACKHORSE LANE · WALTHAMSTOW · LONDON E.17

Manufacturers of MICANITE (Built-up Mica Insulation). Fabricated and Processed MICA. PAXOLIN Laminated Materials. PANILAX Laminated Materials and Mouldings. EMPIRE Varnished Insulating Cloths and Tapes. HIGH VOLTAGE BUSHINGS & TERMINALS. Distributors of Micoflex-Duratube Sleevings, Micoflex-Durosleeve (Plastics-covered flexible metal conduit) and Kenutuf Injection Mouldings (in most thermo-plastics including P.V.C.)

Oil Circuit-breakers for Outdoor Service at 33 kV.



TYPE OKD1B
Current Ratings
up to 1200 amps
Breaking capacities
up to 1000 MVA
fully A.S.T.A. certified

Operation can be effected by hand-wound or motor-wound spring, solenoid, or pneumatic mechanism.

'ENGLISH ELECTRIC'
switchgear

THE ENGLISH ELECTRIC COMPANY LIMITED, Queens House, Kingsway, London, W.C.2
Switchgear Department, Stafford

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON
SH.9

See the English Electric advertisement for Excitrons which appears on page 31 of this issue

A

. . . for divers bends

WE design and manufacture machines for the bending of all kinds of tubing up to 3" in diameter. With these there is, in addition, a unique bending unit to facilitate the bending of ½" to 2" steam and gas tubing through 180°.

These machines are particularly suited for use with steam and gas tubing—copper tubing—electrician's conduits—light gauge, solid drawn brass tubing—aluminium tubing and light gauge steel tubing. Full service facilities are available and special machines can be designed to order.

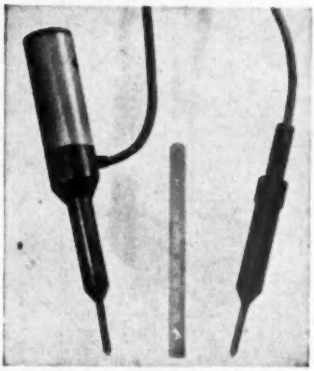
Ask your machine tool distributor or write direct to:

Tubela

Tubela Engineering Co. Ltd.
6 Furze Street, Bow, London, E.3
Telephone: East 4771 (3 lines)

Elwyn Hughes

MEDIUM VOLTAGE ALL INSULATED
TEST LAMP
100 to 500 volts — A.C. or D.C.



★ H.R.C. FUSE IN EACH PROD

Comprises a 250 v., 15 w. pigmy lamp, wired in series with a resistance. Can be easily carried in the pocket.

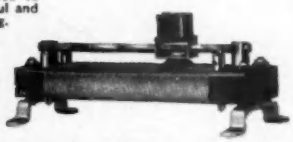
JOHN DRUMMOND (ENGINEERS) LTD.
23 LOCHBURN ROAD, MARYHILL, GLASGOW, N.W.
Manufactured under licence from the Ministry of Supply

IT IS A "CRESSALL-PRODUCT"

CRESSALL Rheostats incorporate sound electrical and mechanical principles in design—yet prices are competitive.

CRESSALL Sliding Rheostat

List No. 80 containing data and prices of our standard sliding Rheostats is both useful and interesting. May we send you a copy?

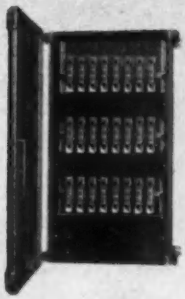


CRESSALL

Registered Trade Name of

THE CRESSALL MANUFACTURING CO. LTD.
TOWER STREET BIRMINGHAM 19
TELEPHONE: ASTON CROSS 2666 (3 lines)
TELEGRAMS: "OHMIC" BIRMINGHAM

You cannot buy better gear



VERTEX DISTRIBUTION BOARDS

FUSES ARE FULLY INTERCHANGEABLE FOR
H.R.C. CARTRIDGES OR ARC DAMPING CARRIERS

15 AMPERE FUSES 250 VOLTS
20 " " 440 "
30-300 " " 440 "

SEND FOR LIST Nº F 653 AND F 553

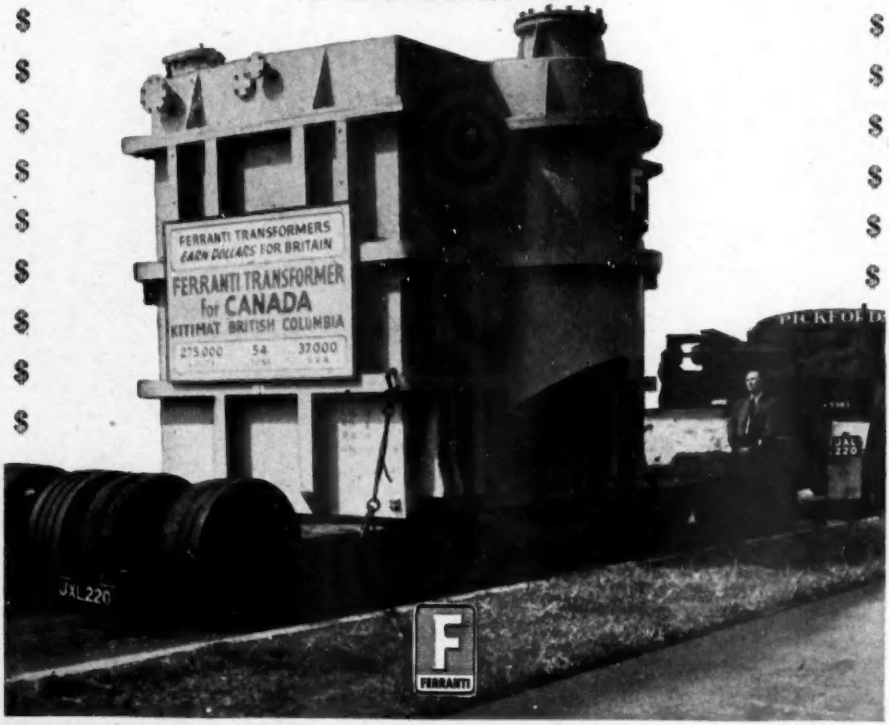
BILL SWITCHGEAR LTD.
ASTON LANE · PERRY BARR
BIRMINGHAM·20

LONDON, S.W.1. A. W. ELLEY 29 PETER ST. | MIDLANDS B.M. GARRATT HEAD OFFICE. | NORTH MIDLANDS C. G. MACKLOR HEAD OFFICE. | CHELTENHAM C. GRAHAM LECKHAMPTON RD. | MANCHESTER 3. R.M.POLLARD WOOD STREET. | BRISTOL 2. W. L. WHITE CHURCH LANE. | YORKSHIRE N. WHARTLES HEAD OFFICE. | GATESHEAD 8. L. J. DAVIS 252 HIGH CHURCH RD. | GLASGOW A. DUNN 27 ST VINCENT LANE

3 dollar earning successes for Britain

In addition to the Alcan, British Columbia, Canada, and Garrison Dam, North Dakota, U.S.A. contracts, Ferranti have now secured a third contract to supply the U.S. Army Corps of Engineers with six 56.5 MVA, 230kV single-phase Transformers for the McNary Dam Project in Oregon. The illustration shows one of the Alcan Transformers on the first stage of its journey to Canada.

FERRANTI



FERRANTI LTD · HOLLINWOOD · LANCS

London Office: Kern House · Kingsway · W.C.2

FT 133

A NEW Visual Indicator

This new visual indicator has been produced to fulfil an infinite number of different uses. It is ideal for the efficiency-minded in offices, factories, hotels, waiting rooms, hospitals, etc.

The pressing of a button will illuminate the message in the call panel and can, if required, emit a distinctive buzz.

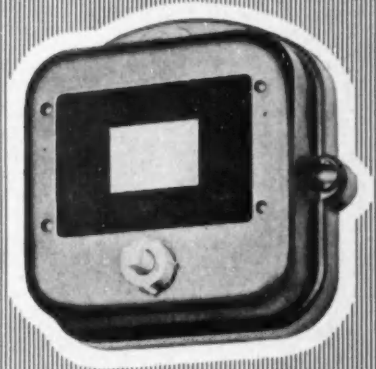
There is a big future for this novel indicator—it will pay you to know more about it.

and Visual Transmitter

The visual transmitter is designed to provide a simple means of operating the visual indicator. One press of the push and the message in the indicator panel is illuminated together with the panel in the transmitter, a second press and both lights are cancelled, this obviates the signal being left on unintentionally.

Both units are finished in bronze colour —operated on 12 volts from A.C. mains, through a small transformer. The indicator is available with or without buzzer.

Write for further details and prices today and list of alternative wordings for indicator panel.



GENTS' OF LEICESTER

VISUAL INDICATORS

GENT & COMPANY LIMITED . FARADAY WORKS . LEICESTER

London Office and Showrooms: 47 Victoria Street, S.W.1 Also at Newcastle, Birmingham and Bristol

Other Products include: FIRE & BURGLAR ALARMS . STAFF LOCATORS . LUMINOUS CALL SYSTEMS . BELLS, ETC.

for CONDUCTORS

COPPER WIRE
plain or tinned, cotton, paper or asbestos covered.

ALUMINIUM WIRE and STRIP
plain, cotton, paper or asbestos covered.

COPPER or ALUMINIUM STRAND
for overhead power transmission.

COPPER or ALUMINIUM BUSBARS

CADMIUM COPPER

Also K for LIGHT ALLOY

CONDUIT TUBING, BARS, TUBES AND SECTIONS

Durcilium (Regd.) Alumagnese

E. & E. KAYE LTD.
PONDERS END · ENFIELD · MIDDLESEX

Telephone.. Howard 1601
Telegrams.. Cuwire, Enfield

K.5. T.A.5284

SIEMENS

Watertight

IRONCLAD FUSED-SWITCH

15 AMPS 250 VOLTS S.P.N. OR D.P.

DESIGNED FOR
OUTSIDE USE IN
EXPOSED POSITIONS
such as
DOCKS, WHARVES,
RAILWAY YARDS, MARINE WORK, Etc.

Tested by immersion for 15 minutes in 12 feet of water equivalent to 5.2 lbs. per square inch

APPROXIMATE DIMENSIONS: Overall 5¼" × 4¾" × 4¼" Fixing holes ⅛" at 5⅛" centres

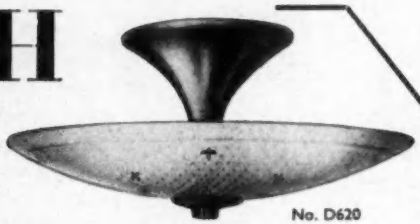
SMALL—ROBUST—
AND GUARANTEED WATERTIGHT

Available from Stock

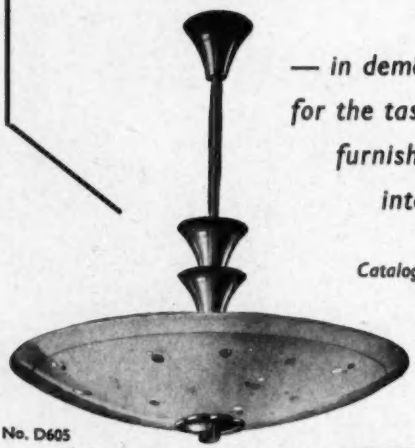
WRITE NOW FOR LEAFLET No. Z.200

Advt. of SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, 38 39 Upper Thames Street, London, E.C.4
Branches at Belfast, Birmingham, Bristol, Cardiff, Dublin, Edinburgh, Glasgow, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, Nottingham, Sheffield.

McGEOCH
Lighting Fittings



No. D620



No. D605

— in demand for the tastefully furnished interior.

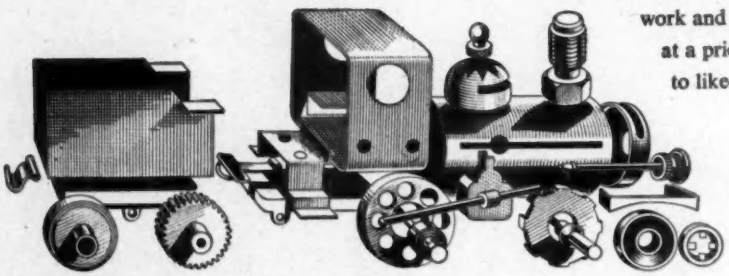
also makers of—
Watertight Lighting Fittings
Switch and Fuse Gear
Watertight Sockets and Plugs
Lampholders, etc., etc.

Catalogues on request.

WILLIAM McGEOCH & CO. LTD.
BORDESLEY, BIRMINGHAM 10
also Glasgow, London and Newcastle-on-Tyne

HIGH SPEED AUTOMATICS

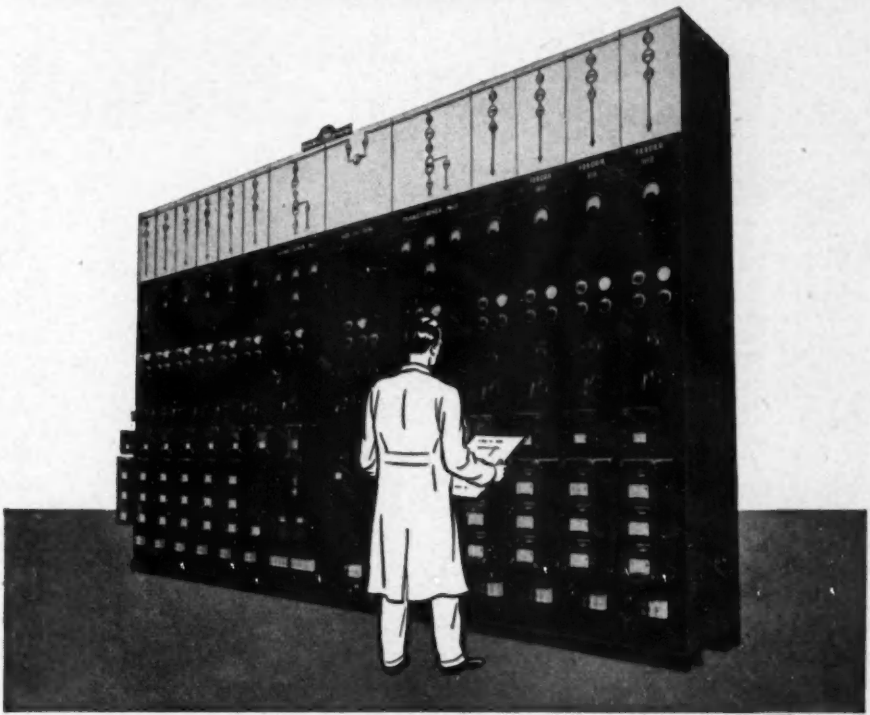
Modern machinery and mass production methods give you top quality capstan and automatic work and sheet pressings at a price you are sure to like—and on time.



GRIFFITHS, GILBART, LLOYD & Co. Ltd.
EMPIRE WORKS, PARK ROAD, BIRMINGHAM 18
Telephone: NORthern 6221

GGL

When it's lighting-up time in LEEDS—



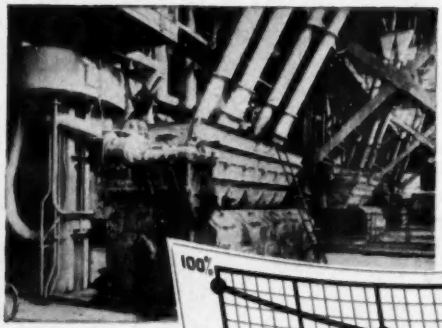
S.W.S. equipment takes the load

A large proportion of the power supply for the city of Leeds is handled by four S.W.S. metal-clad switchboards controlled by S.W.S. control boards like the one shown here.

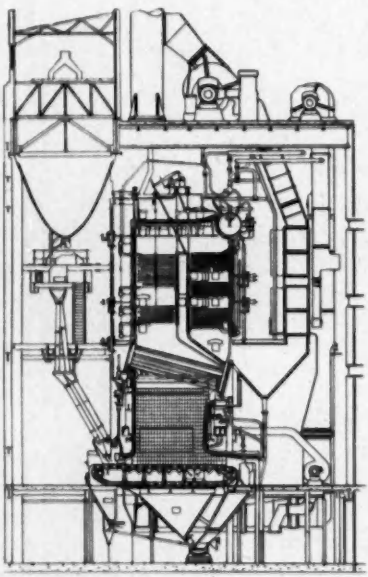
SOUTH WALES SWITCHGEAR LTD

BLACKWOOD · MONMOUTHSHIRE

S·W·S



High "boiler-availability" at BALMAIN



General arrangement of one of the high pressure boilers at Balmain.

THE old adage, "The proof of the pudding . . ." applies equally to steam-raising plant. The modern BABCOCK boiler embodies all the scientific and practical knowledge acquired in over 75 years of boiler engineering, but the user is interested in such factors only insofar as they are revealed in sustained, high-level performance. "Proof of the pudding" in this instance, is provided by a five-year record of the availability* of Nos. 2 and 3 high pressure boilers at the Balmain Power Station of the Electric Light and Power Supply Corporation, Sydney, N.S.W.; which shows, over the period 1947/51, *a sustained high availability, averaging nearly* 90%.

These units, installed by Babcock & Wilcox of Australia Pty. Ltd. in 1946, were the first high pressure boilers in Australia. They are each designed for an output of 125,000 lb. steam/hr., at 1,250 lb./sq. in. and 915°F., and are operated by Bailey automatic combustion control. The fuel has varied from 60% coke breeze with 40% coal, to 100% coal—the latter of wide variety, with ash contents from 5½% to 35%—the coal and coke breeze being fired on the "sandwich" system, on Style 28 travelling-grate stokers.

With two further similar boilers recently commissioned, two more under construction and another on order—all BABCOCK—boiler capacity at Balmain will provide for a total output of some 115,000 kW.

**The number of hours the boilers were available for service expressed as a percentage of the number of hours in the year.*

BABCOCK BOILERS

BABCOCK & WILCOX LTD., BABCOCK HOUSE, FARRINGDON ST., LONDON, E.C.4

1
To re-fuse, simply insert sixpenny piece into screw-head and give ¼-turn.
2
Out drops spent fuse. Slot now clear for immediate re-placement.
3
Insert new fuse and lock by re-turning screw.

Re-fused in 15 seconds without dismantling

Re-fusing is quick and simple with the Ediswan rectangular pin plug and plug adaptor. The adaptor is wired to an appliance in place of a normal plug. A second appliance can then be fed from the adaptor outlet.

EDISWAN

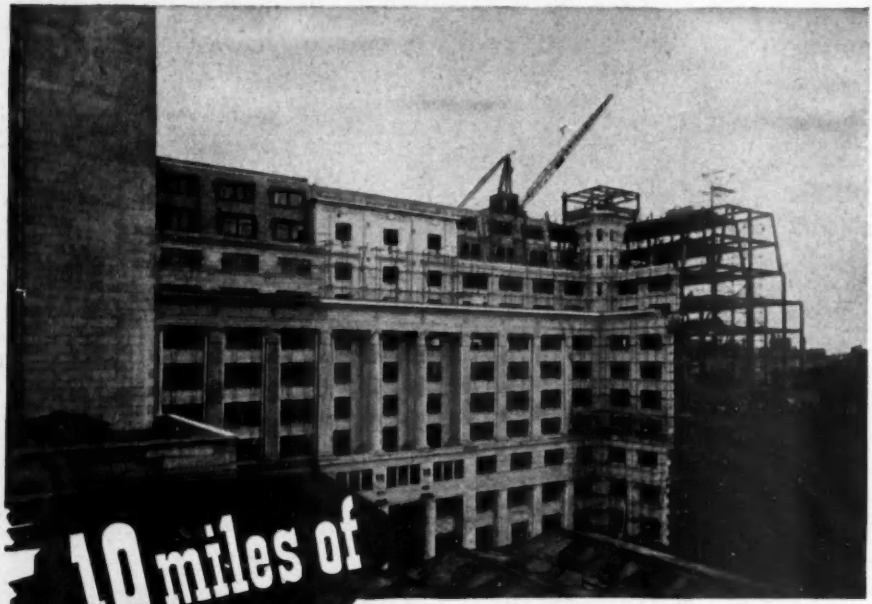
RANGE OF ELECTRICAL ACCESSORIES

A catalogue and price list of the complete range of Ediswan electrical accessories is available on request.

THE EDISON SWAN ELECTRIC COMPANY LIMITED

155 Charing Cross Road, London, W.C.2, and branches

Member of the A.E.I. Group of Companies

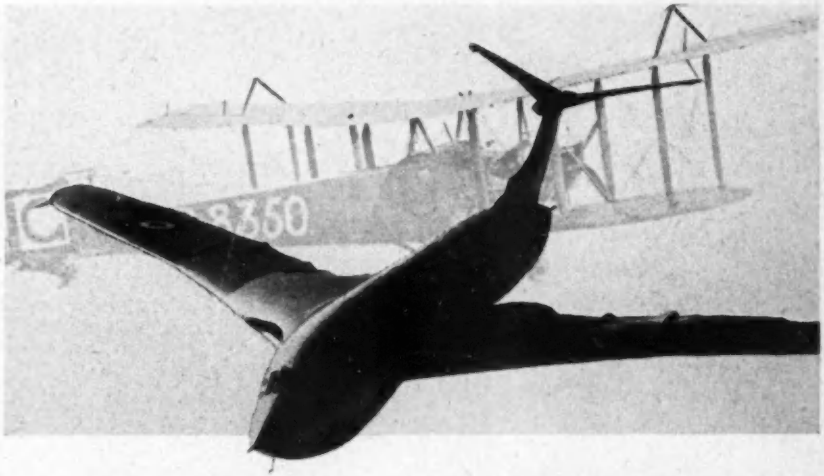


-G.E.C. UNDER-FLOOR METAL DUCTS

IN THE NEW EXCHANGE BUILDING LIVERPOOL

This installation of the G.E.C. Under-floor metal duct system is ample proof of the success of modern electrical distribution in a modern building. Complete flexibility, mechanical strength and electrical continuity have been achieved after years of experience and collaboration with architects and contractors.

THE GENERAL ELECTRIC COMPANY, LIMITED, MAGNET HOUSE, KINGSWAY, LONDON, W.C.2



You have to hand it to Handley Page

In the days when aircraft were almost literally ' kites ', Handley Page was a top name in the industry. An alert quest for new ideas, new methods, new materials has kept them well in the front rank ever since. What better proof of that than their brilliant new Victor crescent-wing four-jet bomber?

No user of ' DELARON ' Laminated Plastic will be surprised to know that Handley Page make good use of this versatile material. Its exceptional combination of properties gives it a host of uses. One or more may provide you with just what you are looking for.

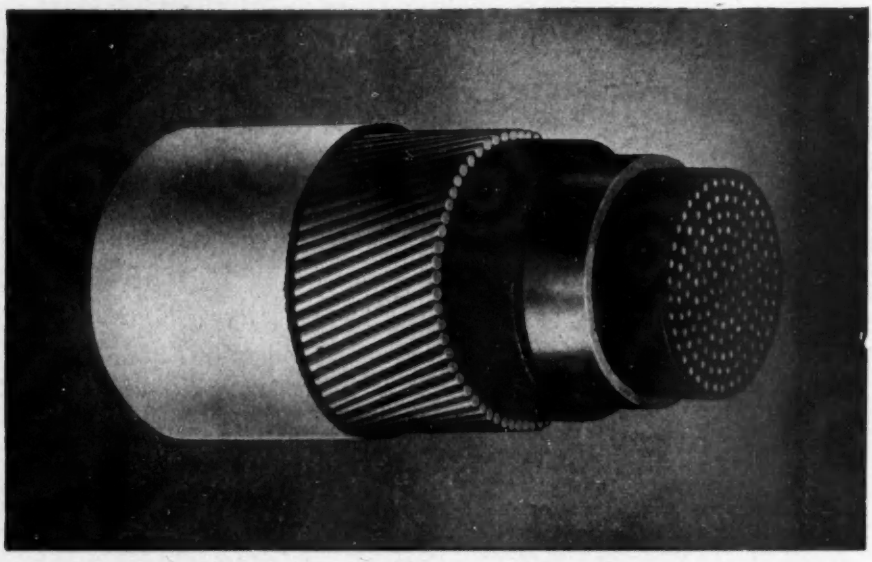
If you need dependable electrical insulation, good chemical resisting properties or high mechanical strength —at economical cost—then you will be interested in ' DELARON ' Laminates. If you want an extremely tough, lightweight material that you can drill, punch, heat-form, saw, turn and generally machine much more quickly and easily than steel, then you should investigate the many grades of ' DELARON.' If you use metal or wood, if you make cars, toys, furniture, radios, refrigerators, aeroplanes, office equipment, chemical plant, textiles, even precast concrete—or merely want a better material for gears, machine-guards, bench-tops, worktrays and a score of other uses in your factory and offices, write for full information.

You can do a better job for less with

Delaron LAMINATED PLASTIC DE LA RUE

In sheets from 38 in. by 28 in. up to 8 ft. by 4 ft. and in thicknesses from 1/32 in. to 4 in. in natural (brown) black.

Write for ' Delaron ' leaflet to **THOMAS DE LA RUE AND CO. LIMITED (PLASTICS DIVISION)**
Imperial House, 84-86 Regent Street, London W.1. Regent 2901



The above photograph illustrates only one of the many types of Paper Insulated cables in which the METROPOLITAN CABLE CO. specialises.

MAKE YOURS METRO TOO!

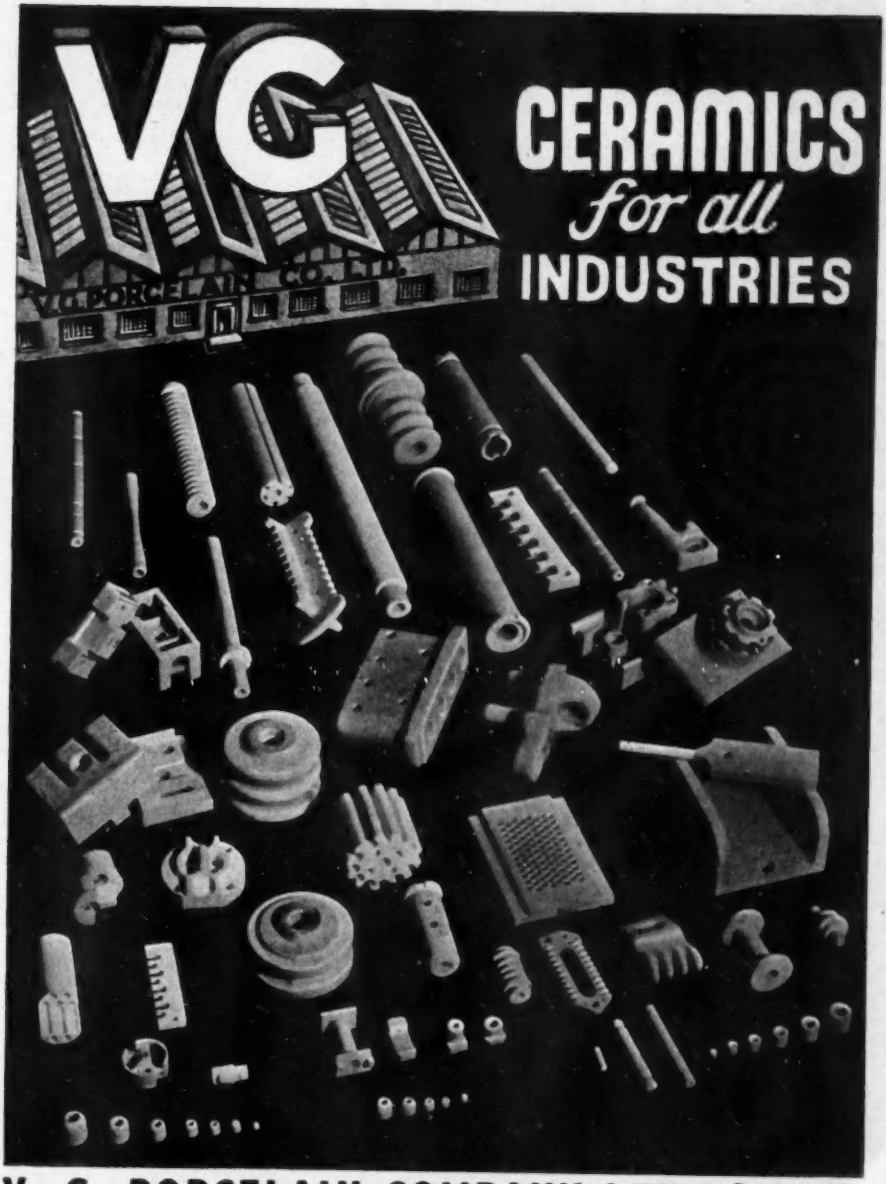
THIS particular cable, namely 140 core RAILWAY SIGNALLING CABLE, paper insulated and impregnated lead sheathed, wire armoured with an over-all serving of hessian tapes, is unique in its design, being one of the largest multicore signalling cables ever supplied to British Railways.

On it depends the entire signalling system of one of London's largest stations.

THE METROPOLITAN ELECTRIC CABLE AND CONSTRUCTION CO. LTD.

CLYDE WORKS • CHADWELL HEATH • ESSEX

Tel.: SEVEN KINGS 1810 Grams: METROCABLE



V. G. PORCELAIN COMPANY LTD. *Dept. "T"*
GORST ROAD, PARK ROYAL, LONDON, N.W.10 *Phone: ELGar 7362-3*

ANOTHER SUCCESS BY PULTRA

The specialists for micro machine tools . . .

INTERNAL MICRO GRINDING

of smaller holes still ! !

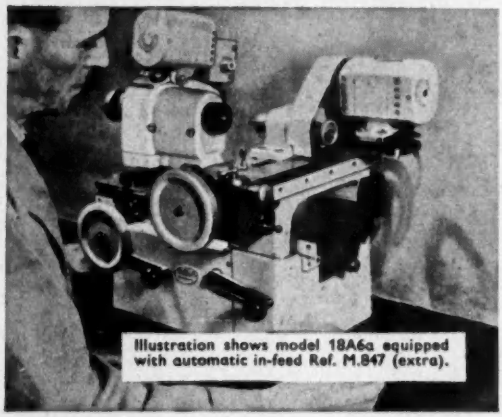


Illustration shows model 18A6a equipped with automatic in-feed Ref. M.847 (extra).

This new machine can grind holes which—from a production view point—have hitherto been regarded as entirely outside the accepted range of internal grinding. Holes of no more than .010 in. can be ground, but the design of the machine is such that bores of ¼ in. and over can also be handled.

Grinds parallel, taper and radii, either singly or in combination.

Hydraulically operated table motion with infinitely variable speeds; automatic in-feed if desired.

Suitable grinding arbors for these machines are available.

Technical literature will be supplied free on request.

PULTRA LTD., 24 GRAVEL LANE, SALFORD, 3, MANCHESTER

CW 2124/40

K KEW W

COVERED

REMEMBER POPPY DAY

winding wire and strip

SILK · ART SILK COTTON

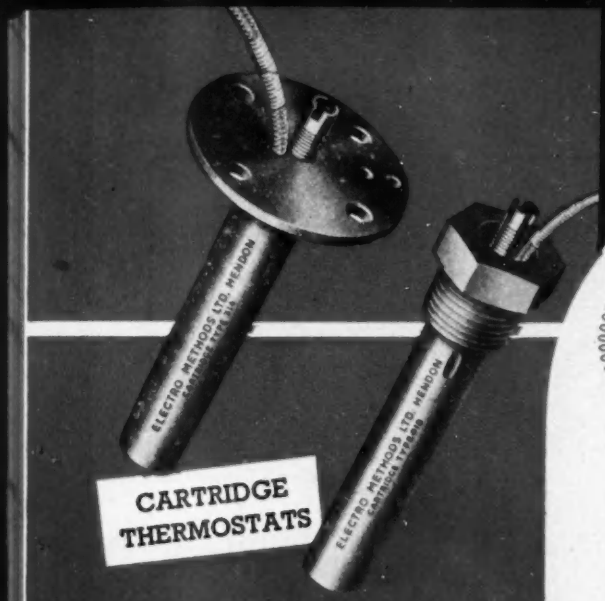
PAPER · ENAMEL

Specify "KEW COVERED" for dependability through the years

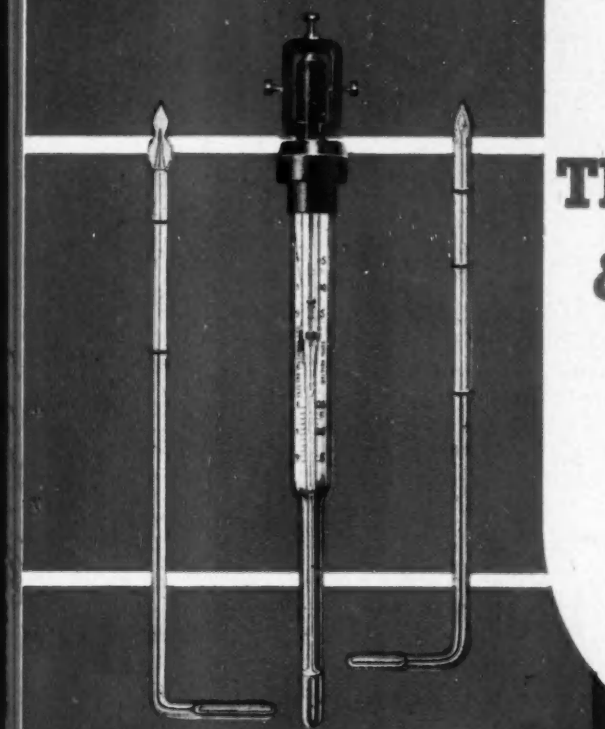
KENT BROS. ELECTRIC WIRE CO. & E. H. PHILLIPS LTD.

KEW WORKS KEW · RICHMOND · SURREY

Tel: Prospect 1032 (3 lines) 'Grams: Encosil Richmond



CARTRIDGE THERMOSTATS



CONTACT THERMOMETERS

ELECTRO METHODS LTD OF STEVENAGE

—the first name for close-limit

TEMPERATURE & HUMIDITY CONTROL

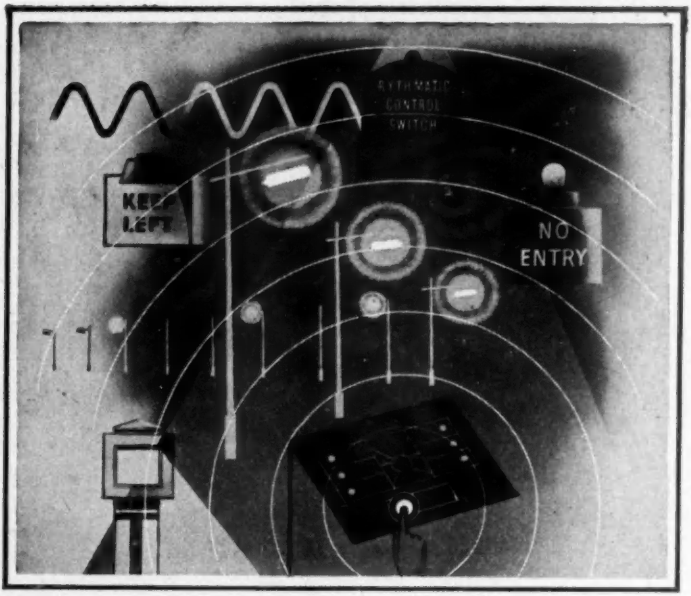
Comprehensive technical data gladly forwarded on request.

Most types now available for

PROMPT DELIVERY

ELECTRO METHODS LTD. (Division TC5), CAXTON WAY, STEVENAGE, HERTS.

PHONE · STEVENAGE 780



All-night, Half-night, Prior-dawn

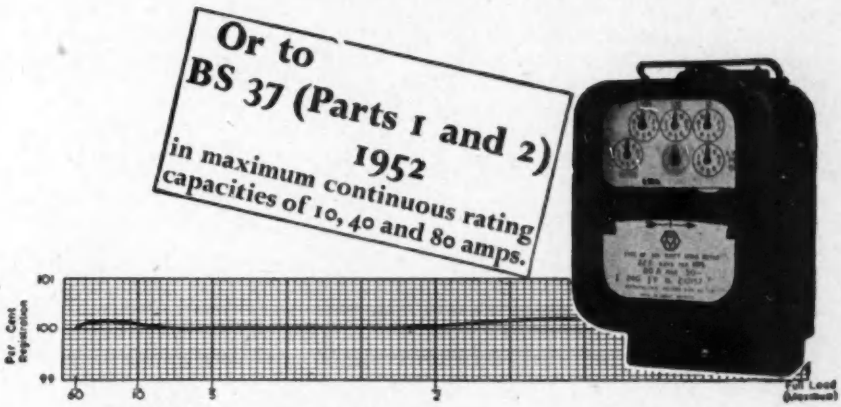
"Rythmatic" ripple control equipment gives the street lighting engineer flexibility of control. He can switch on all lights at once if necessary, or in groups to suit half-night, all-night and prior-dawn conditions. Traffic indicators and bollards can be separately switched. Control is centralized and the signals are initiated by push-button, or automatically, either from the office of the street lighting department or from the injection plant. The Type 46 "Rythmatic" ripple control switch can be readily mounted in existing housings.

RYTHMATIC
RIPPLE CONTROL EQUIPMENT

REMEMBER POPPY DAY

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.
STROWGER HOUSE, ARUNDEL STREET, LONDON, W.C.2. *Telephone: TEMple Bar 4506.*
Telegrams: Strowger Estrand London. *Strowger Works, Liverpool, 7.*
AT. 3771-CX33

Metrovick Type NF Meters



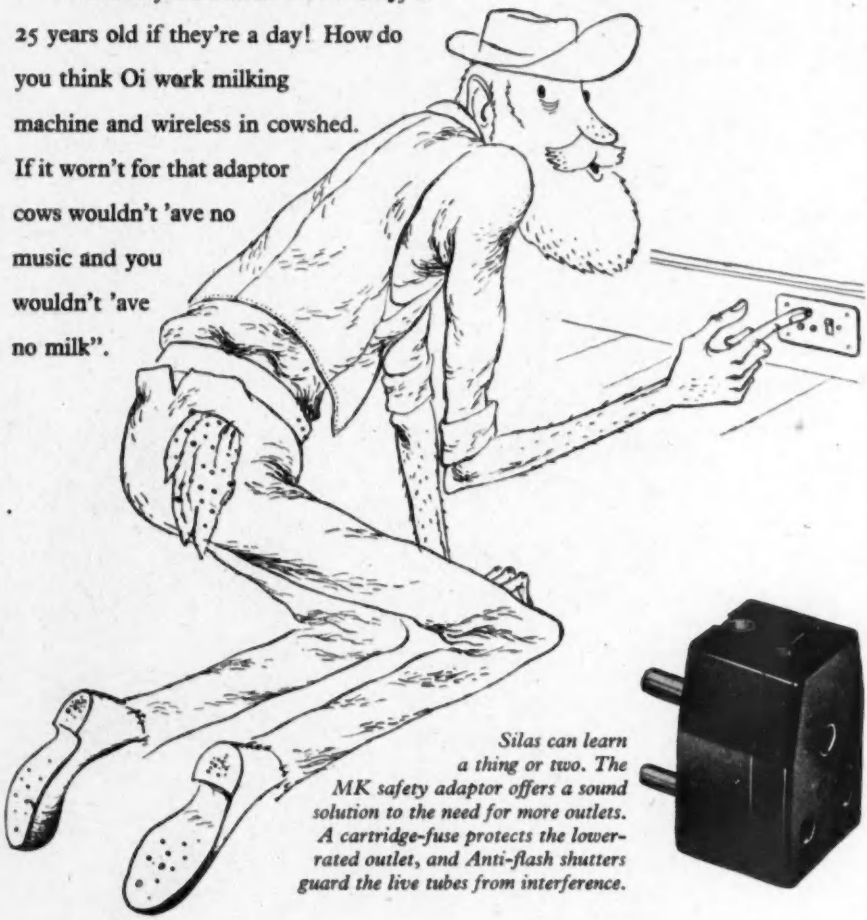
In designing the Type NF meter Metrovick engineers anticipated the requirements of the 1952 specification, consequently the two patterns are fundamentally similar.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER 17
Member of the A.E.I. group of companies

METROVICK *equipment for meticulous metering*

G/A201

'Ere, says Oi to Squire, Oi'll tell thee summat. Widow Piggot showed Oi a foine new gadget this morning. Cuts the electric in two, it do. Squire looks at Oi, sorrowful like. "Silas," 'e says, "You'm a silly old buffer. New? They're 25 years old if they're a day! How do you think Oi work milking machine and wireless in cowshed. If it worn't for that adaptor cows wouldn't 'ave no music and you wouldn't 'ave no milk".



Silas can learn a thing or two. The MK safety adaptor offers a sound solution to the need for more outlets. A cartridge-fuse protects the lower-rated outlet, and Anti-flash shutters guard the live tubes from interference.

MK . . . the mark of the best adaptors

MK ELECTRIC LTD London N18 Telephone: Edmonton 5151

MK78
DHB

99·4% efficiency achieved in flue dust precipitation

We are Exhibiting at the
Fuel Efficiency
IN INDUSTRY AND HOME
Exhibition
NOV. 18 - 28
1953
CITY HALL
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MANCHESTER
ORGANISED BY PROVINCIAL EXHIBITIONS LTD

The first Simon-Carves flue dust electro-precipitators at the new Huncoat power station were commissioned in 1952. They operate in conjunction with pulverised fuel fired boilers of 305,000 lbs/hr continuous maximum rating. Last February, after six months' continuous operation, an official test at full boiler load was carried out without preliminary cleaning of either the boilers or the precipitators. The guaranteed efficiency was 98%. *The efficiency actually recorded under these exacting conditions was 99.4%.*

Please write for our leaflet (No. J.S. 7CD/4/53) on high efficiency boiler flue dust precipitation.

High-efficiency flue dust precipitation by **Simon-Carves Ltd**

SIMON ENGINEERING GROUP

STOCKPORT ENGLAND

OVERSEAS COMPANIES

Simon-Carves (Africa) (Pty) Ltd : Johannesburg
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SC95

Sustained Performance

P&B

THERMAL INSTRUMENTS

For many years, P. & B. Thermal Instruments have been specified for use in power stations, government departments, iron, steel and chemical works, oil plants, cement works and paper mills, both in this country and overseas.

Complete and positive protection for polyphase motors, against phase failure, overload, short-circuit and earth fault is afforded by the correct type of **P. & B. Golds Thermal Overload Relay.**

In addition to Thermal Overload Relays, P. & B. Maximum Demand Indicators are available in twelve different patterns from single-phase to three-phase models for maximum demand tariff, to load indication in unattended substations.

THE P&B ENGINEERING CO·LTD

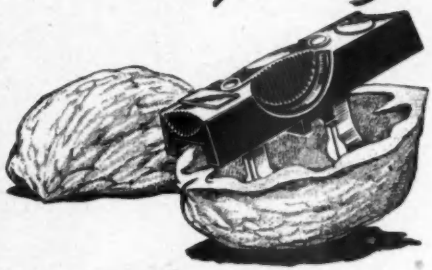
Crompton Way . Crawley . Sussex.

Telephone: Crawley 1004

"OXFORD AND CAMBRIDGE"

No racing event is quite as popular as the Oxford and Cambridge Boat Race and the phenomenal record set up by Cambridge reached its peak in 1951, when the Cambridge Crew won against Oxford in a second row after their adversaries had sunk in the first race. Subsequently Cambridge rowed against Yale and Harvard in the U.S.A. and were easy victors, also taking in their stride Boston University and the Massachusetts Institute of Technology.

Size isn't *everything!*



In a Nutshell—

YOU GET EVERY QUALITY NEEDED FOR ELECTRICAL PROTECTION WITH SLYDLOK

When the need calls for compact, reliable fuses, fuses to withstand extremes of temperature, vibration and shock—order "SLYDLOK". Increased production capacity now enables us to offer expeditious delivery of the small fuse with the big advantages.

Enquiries are welcomed, send for descriptive literature.

In a nutshell

SLYDLOK

THE FUSE YOU WILL EVENTUALLY USE

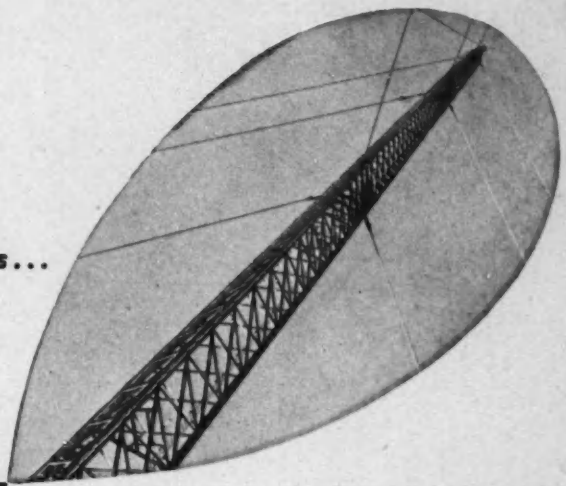
EDWARD Wilcox & CO., LTD.

WYTHENSHAWE - MANCHESTER

Tel.: WYThenshawe 2235/6/7. *Grams*: "Slydlok," Manchester

dm EW.48

from Television Masts...



BICC WORLD LEADERSHIP

to Television Camera Cables

World demand for Television grows daily. To help meet it, the vast research, manufacturing and construction resources of the BICC Group are continually at the service of the system engineer . . . from the fabrication and erection of 750 ft. aerial masts , . . to the development of television camera cables with moulded-on Couplers.

The World's Largest Cable Makers

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BRITISH INSULATED CALLENDER'S CABLES LIMITED

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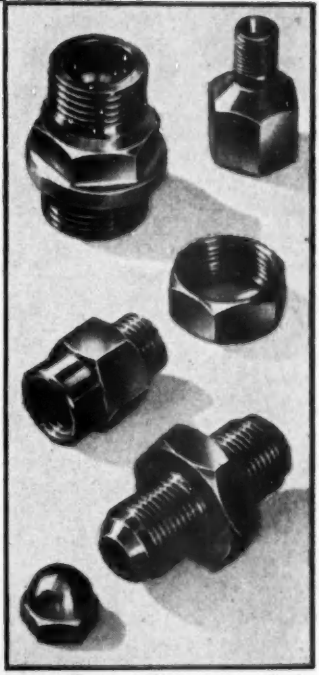
For highest speed with absolute precision—specify

No. 4 Turning and Screwing Brass Rods

Ever higher speeds demand ever greater precision—and British industry needs both if production is to be increased and costs reduced. McKechnie Brothers have developed a range of standard high-speed turning and screwing rods, including the popular ***No. 4*** and ***YS,*** all of which are guaranteed to combine the correct alloy and temper for maximum machine speeds and longest tool life. For full details of these and other MKB free machining rods please write to:—



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Metal Works: Rotton Park Street, Birmingham, 16.

Other Factories: Widnes, London, South Africa, New Zealand.

Branch Offices: London, Leeds, Manchester, Newcastle-on-Tyne, Gloucester, Paris.

Know your Goods!

These facts sell the G.E.C. Cooker

Easy to use, easy to clean.

Large oven, fitted with counter-balanced drop-down door, can accommodate 18 lb. turkey.

Ovenmaster illuminated dial control simplifies and supervises all oven cooking.

3 large boiling plates take up to 5 pans at one time (grill boiler for economy.)

Simmerswitch gives thermostatic control for boiling and steaming.

Extra large warming cupboard keeps food hot, warms plates and dishes.

Beautiful modern appearance, sparkling finish — several colour combinations.

Retail Price **£35·0·0** *Tax Free.*

Tell your customers about the G.E.C. Cooker DC114

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Switchboard Watchdogs

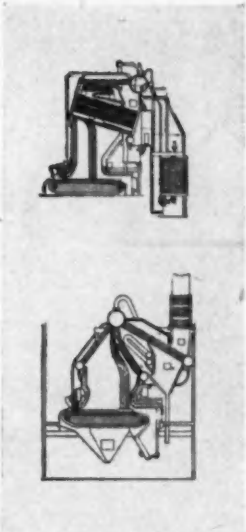
Install Brush H.R.C. Cartridge fuse links to stand guard over your valuable electrical plant. These watchdogs—tireless thoroughbreds—never sleep. If a heavy, damaging fault current tries to slip past they snap it off well before the peak is reached. Voltage rise is negligible. A special shunt wire indicates the particular fuse which made the kill. The Brush H.R.C. fuse link range covers current ratings from 2 to 300 amperes and is to British Standard dimensions. Ask for complete pedigree in Publication No. 81002.

H.R.C. Fuse Links by BRUSH

THE BRUSH ELECTRICAL ENGINEERING CO. LTD, HOPKINSON WORKS, CARDIFF, GREAT BRITAIN.

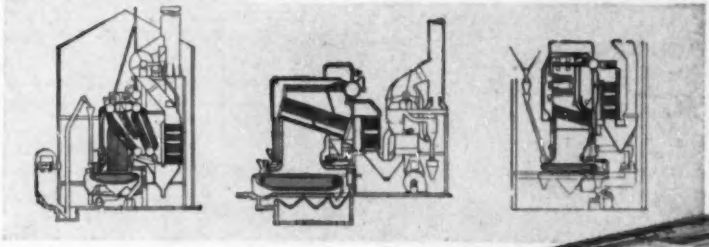
BIRMINGHAM · BRISTOL · CARDIFF · GLASGOW · LEEDS · LONDON · LOUGHBOROUGH · MANCHESTER · NEWCASTLE · SHEFFIELD

a.31



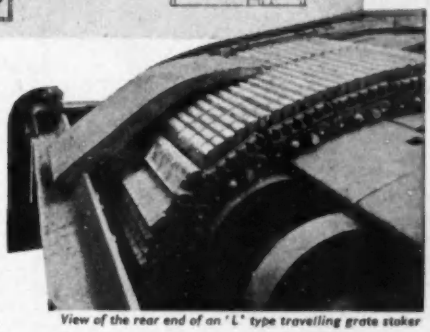
An 'L' Stoker for them all

For every known design and size of water-tube boiler there is a highly efficient 'L' type travelling grate stoker.



- *Close control of air supply*
- *Automatic cleaning of fire bars*
- *Burns efficiently any fuel from refuse to anthracite*
- *Remarkably low maintenance, with parts requiring attention easily accessible*

Please apply for full technical data



View of the rear end of an 'L' type travelling grate stoker

The result of Enterprising Engineering by ICL

INTERNATIONAL COMBUSTION LTD.

LONDON OFFICE: NINETEEN WOBURN PLACE, W.C.1. Works: Derby, England; Port Elizabeth, South Africa; Sydney, Australia.

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DIESEL ELECTRIC GENERATING PLANT

SEND FOR LATEST LITERATURE AND PRICE LISTS OF ALL LISTER GENERATING PLANTS AND WATER PUMPS

2½	kw	- -	£345
4·5	kw	- -	£440
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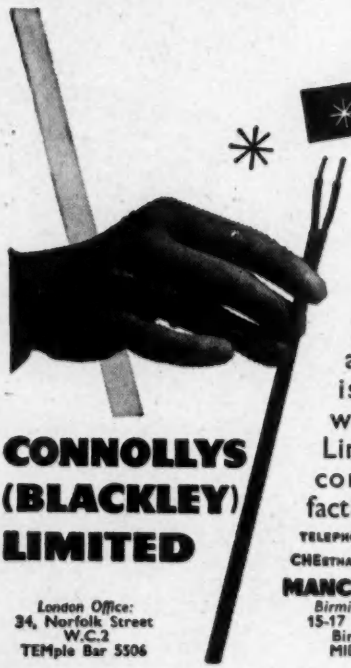
Also at STAMFORD, GLASGOW *and* DUBLIN



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ANOTHER JOB FOR LIMPET TAPE

How often are those words heard in factory, workshop, garage and home—and they imply complete reliability both in the matter of electrical insulation and also for a wide variety of other applications.

The quality of the adhesive compound is unsurpassed and whether you use or sell Limpet Tape, your complete satisfaction is assured.

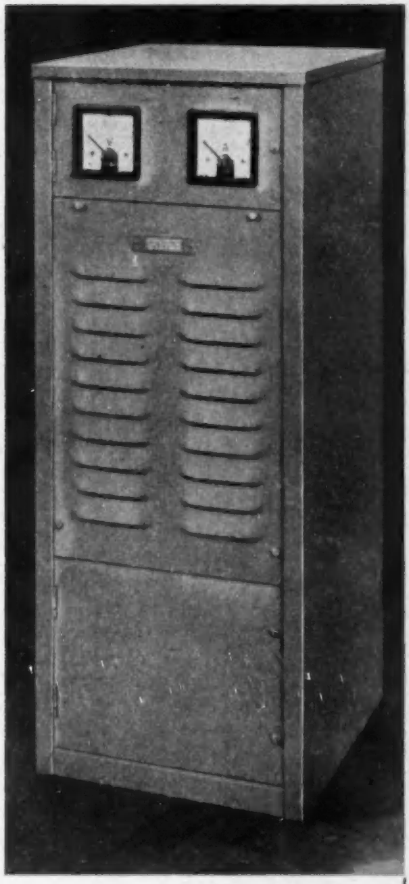
We invite you to write for descriptive literature and samples of Limpet Tape.

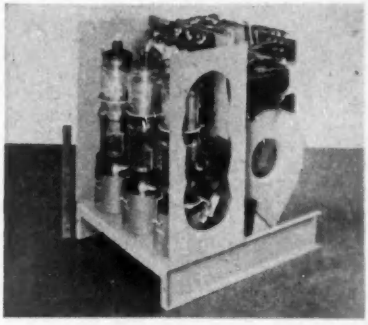
Medium voltage industrial excitrons

'ENGLISH ELECTRIC' excitrons are suitable for a wide range of rectifier applications because they are robust, compact and combine high converting efficiency with long service life.

Illustrated is a standard 100 amp. industrial rectifier for operation at 600 volts D.C. maximum. The unit incorporates three type A.R.62 excitrons on a withdrawable chassis. A standard 200 amp. unit is also available, having six excitrons on two chassis.

'ENGLISH ELECTRIC' excitrons are supplied as complete rectifier equipments, or on the standard three-tube chassis shown, also as loose tubes.





'ENGLISH ELECTRIC'
excitrons

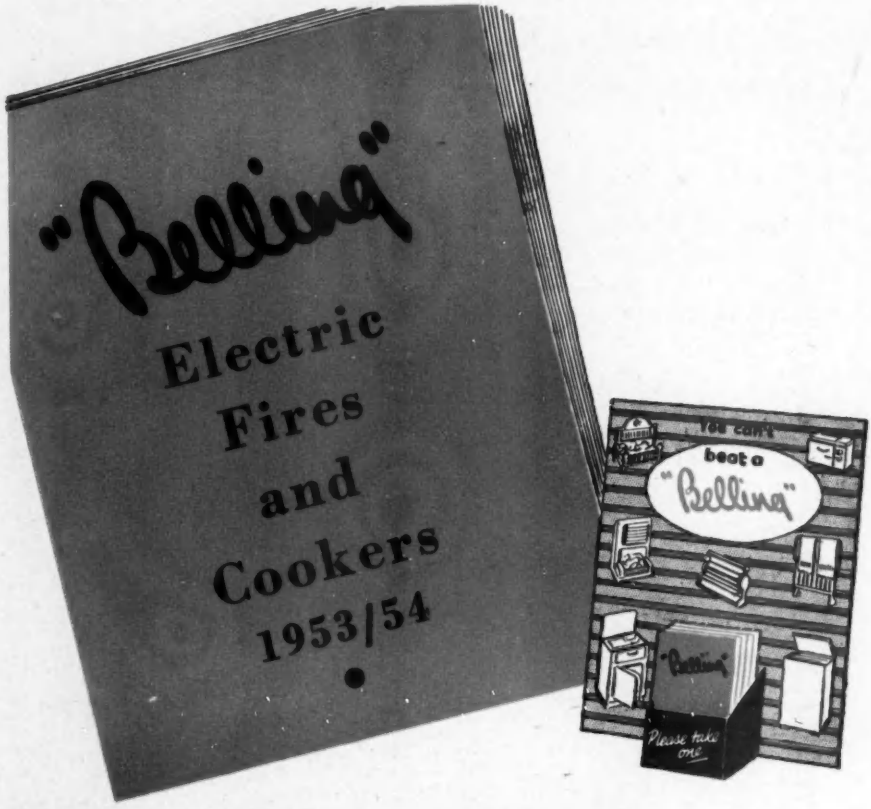
THE ENGLISH ELECTRIC COMPANY LIMITED, QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Rectifier Sub-station Department, Stafford

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

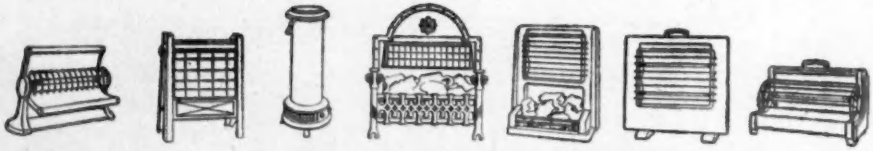
IG. 2

See the English Electric advertisement for Switchgear which appears on page 3 of this issue



Have you got yours yet?

The Fire season has arrived—and so has our new 44-page catalogue!
If you haven't received your copies yet, together with the new showcard/catalogue holder, let us know right away.
And if, by any chance, you haven't ordered your "Belling" fires, take our tip and do so now—before it's too late to catch the Season's trade.



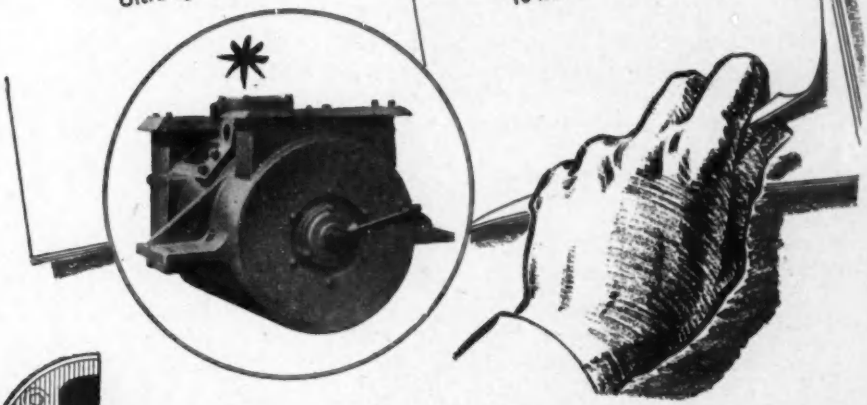
BELLING & CO. LTD., BRIDGE WORKS, ENFIELD, MIDDX. HOWard 1212

CRC403

Let's introduce you to other Electro Dynamic products

Whatever electrical equipment you require "Electro Dynamic" can supply it. Here is a partial list of "Electro Dynamic" products :

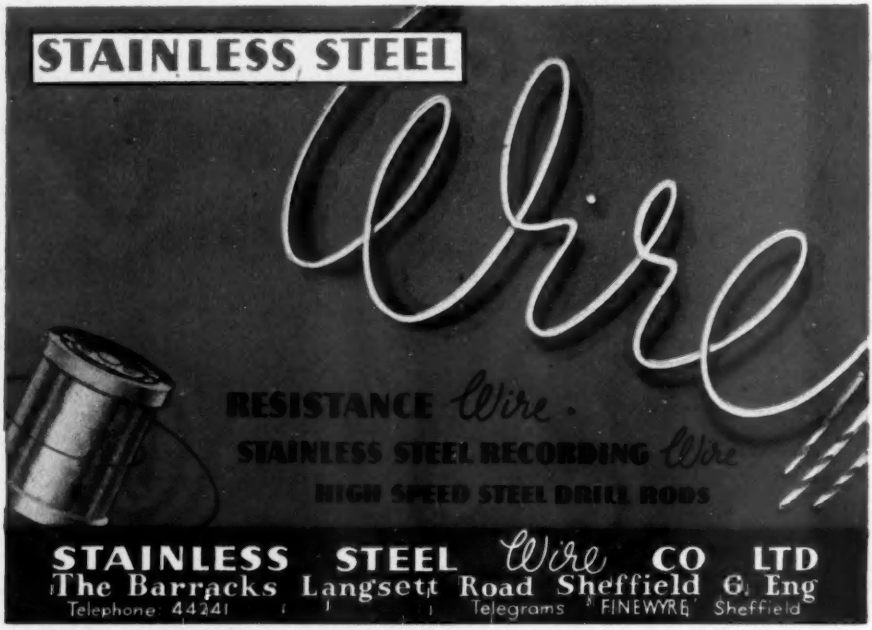
1. Motors and Generators, D.C. ¼ and 150 H.P., including axial flow fan and flame-proof types.
2. 30 kW lightweight Drip Proof Marine D.C. Generators.
3. Battery Traction Motors. Ultra lightweight types.
4. Polyphase Variable Speed Commutator Motors, 3/80 H.P.
5. Variable Speed, 40:1 range, single or three phase Motors, ¼ to 5 H.P., continuously variable.
6. Frequency Changers.
7. Alternators ½ to 60 kVA, and self-regulating up to 10 kVA.



ELECTRO DYNAMIC CONSTRUCTION COMPANY LTD.

ST. MARY CRAY, KENT *Phone: Orpington 2560/3*

Switchgear Works: BRIDGWATER, SOMERSET *Phone: Bridgwater 2882*

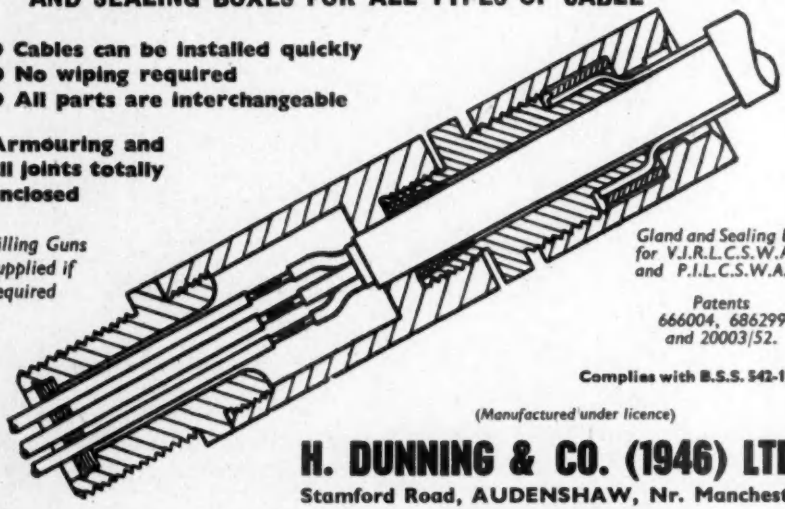


'HAWKE' IMPROVED COMPRESSION TYPE CABLE GLANDS AND SEALING BOXES FOR ALL TYPES OF CABLE

- **Cables can be installed quickly**
- **No wiping required**
- **All parts are interchangeable**

Armouring and all joints totally enclosed

Filling Guns supplied if required



Gland and Sealing Box for V.I.R.L.C.S.W.A./S and P.I.L.C.S.W.A. S.

Patents 666004, 686299 and 20003/52.

Complies with B.S.S. 542-1947

(Manufactured under licence)

H. DUNNING & CO. (1946) LTD.

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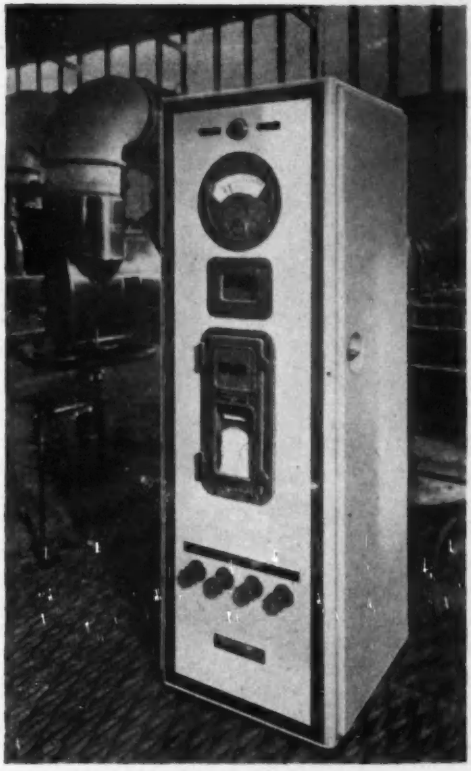
Telephone: DENton 2828

REMEMBER POPPY DAY

B.E.A.

Generating Stations use "Dionic" water purity meters



The illustration shows one of the "Dionic" Water Purity Meters recently installed at Rye House Generating Station. These instruments continuously indicate and record the condition of water in the feed system and enable it to be kept under constant observation.

Publication No. J216 gives full details of these units and is free on request.

DIONIC TRADE MARK

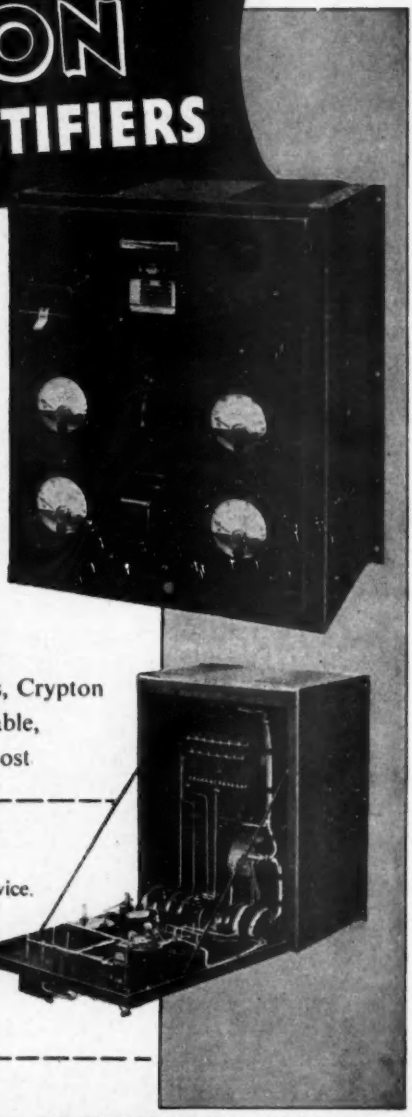
EVERSHED & VIGNOLES LTD

ACTON LANE WORKS · CHISWICK · LONDON · W.4

Telephone: Chiswick 3670 *Telegrams: Megger, Chisk, London* *Cables: Megger, London*

6/101

CRYPTON
SELENIUM RECTIFIERS



D.C. POWER SUPPLY FROM A.C. MAINS

for

BATTERY CHARGING
ELECTRO MAGNETIC APPARATUS
ELECTRO PLATING
CATHODIC PROTECTION
ELECTROLYSIS
ENGINE STARTING
LABORATORY SERVICE, etc.,

For these and all other low medium power requirements of D.C. power from A.C. mains, Crypton Selenium Rectifiers give many years of reliable, trouble-free service at the lowest overall cost

The Rectifier illustrated is for Laboratory, School, Demonstration and Development Service. It gives infinitely variable output for both D.C. and A.C. supplies with both A.C. and D.C. outputs simultaneously recorded.

Write for full details and literature

CRYPTON EQUIPMENT LIMITED · BRIDGWATER · SOMERSET

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A LANCASHIRE DYNAMO COMPANY

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Always specify
R & M Bearings
The rapid progress made in British atomic research owes much to trustworthy, enterprising equipment.
Essential components wherever there are moving parts, R&M Bearings will ensure smooth, frictionless running and withstand high speeds, acceleration, heat, pressure and other intense stresses.
The trouble-free service they give in such arduous conditions is a tribute to the fine materials and careful workmanship that characterise their manufacture.
BALL & ROLLER
R&M
BEARINGS
RANSOME & MARLES BEARING CO., LTD.,
NEWARK-ON-TRENT, ENGLAND.

PLEASE GIVE GENEROUSLY FOR POPPY DAY

K/RM.105.

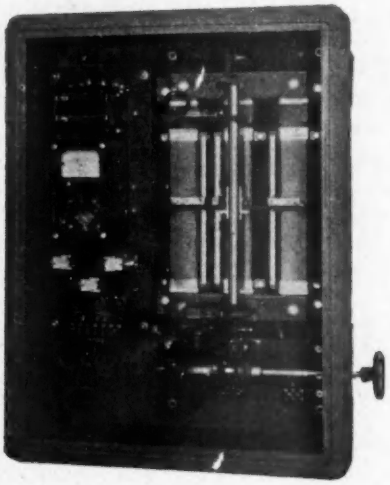
HAVE YOU TRIED
'DIAMOND H'
SNAP-INS?

Simple in design, rugged in construction, "Diamond H" Snap-ins are built to give positive unfailing action under the most exacting conditions. Spring clips hold them firmly and permanently in position—no fixing screws!

Rating 3 k.w. 200/250v A.C. Neon Pilot Lights have large faceted lenses to give maximum light output. Rating ¼ watt 230/250v A.C./D.C. also available for 115/125v.

"DIAMOND H" SWITCHES LTD
GUNNERSBURY AVENUE, CHISWICK, LONDON, W.4
Telephone: CHISWICK 6444 (7/8 Cables and Grams: "DIAMONHART, CHISK, LONDON"

'ON-LOAD' VOLTAGE REGULATING EQUIPMENT



When it is essential that the supply voltage must remain constant regardless of mains fluctuations, B.P.T. voltage regulating and stabilising equipment is a necessity. Output voltage is maintained constant despite variations in frequency, load or load power factor. Wave form distortion is negligible. Standard models include air cooled, oil cooled and fully tropicalised types up to 240 amps., single phase, and 150 amps., three phase.

* *For detailed information and full performance details please write for booklet 4061.*

BRITISH POWER TRANSFORMER CO. LTD.
QUEENSWAY, PONDERS END, MIDDLESEX
Telephone: HOWard 1492. Telegrams: Vitrohm. Enfield.

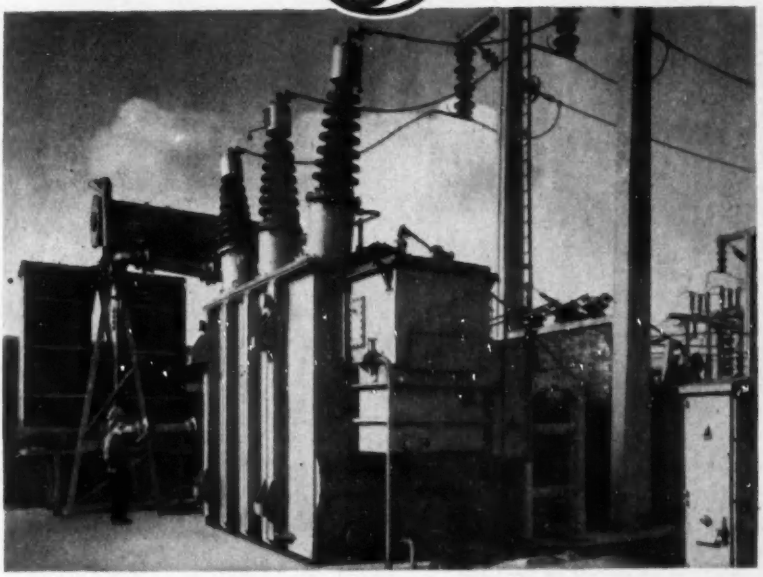
6 KVA single phase wall mounting model (with front cover removed)

BP.4061/CH

POWER TRANSFORMERS

by

B T-H



Recent installations include:

FIRST OF SIX 120-MVA, 275-kV transformers for the B.E.A. Super Grid.

FIRST OF SEVEN 16·6-MVA, 220-kV transformers for Haywards Substation, New Zealand.

SEVENTH 15-MVA, 220-kV transformer for S.E.C. Victoria Grid, Australia.

*We make **all** types of transformers—also Cast-in-concrete and Oil-immersed Reactors, Step Voltage Regulators, Arc Suppression Coils, Oil Testing Sets, Oil Filter Presses.*

THE

BRITISH THOMSON-HOUSTON

COMPANY LIMITED RUGBY ENGLAND

Member of the AEI group of companies

A4650

Ashathene is manufactured in all standard sizes and is also available in S.W.A. and D.W.A. classes. Please send for leaflet TL/1001 and price details.

ASHATHENE provides the answer to an efficient and labour-saving electrical wiring in the home and factory. Made to a very high standard, Ashathene is a better cable electrically and mechanically at a lower cost.

Features of Ashathene are:

HIGH DIELECTRIC—Polythene insulated cores have a measured insulation resistance more than 100 times that of similar rubber insulated material.

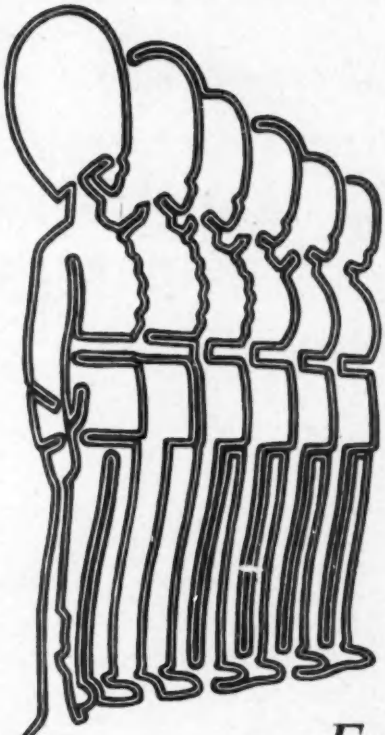
HIGH VOLTAGE INSULATION—High voltage tests on Ashathene Cable show a factor of safety 1.6 times greater that the equivalent rubber insulation on the same size of cable.

FIRE RESISTING QUALITIES—The P.V.C. used on the sheathing of Ashathene will not support or spread a flame and, unlike rubber, is self-extinguishing when the flame is removed.

MECHANICAL QUALITIES—Ashathene is a tough flexible cable which is unaffected by climatic conditions. It is manufactured to give long and trouble-free service. Compared with rubber, polythene insulated conductors will withstand over twice the mechanical pressure without an electrical failure occurring.

ASHATHENE THERMOPLASTIC INSULATED CABLES

AERIALITE LTD • CASTLE WORKS • STALYBRIDGE • CHESHIRE



For uniform precision

Crompton

RUBBER INSULATED CABLE

ELECTRICAL EQUIPMENT

CROMPTON PARKINSON LIMITED, CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2.

Telephone: CHAncery 3333 *Telegrams: Crompark, Estrand, London*

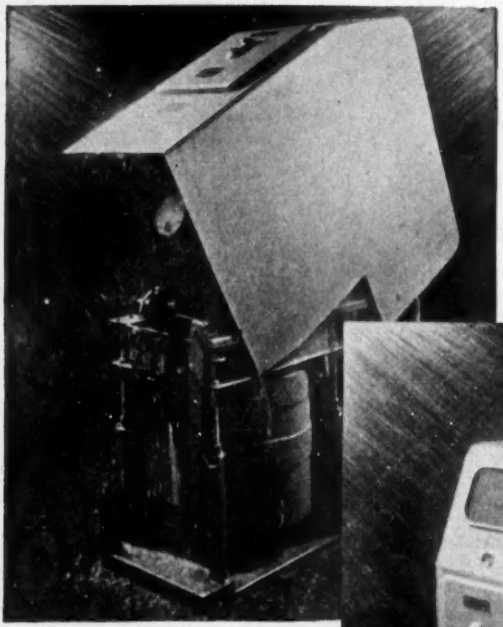
Never mind the weather —

never mind the rain!

IV10 OUTDOOR SWITCHGEAR

for all climatic conditions

(ALSO FOR INDOOR USE)



Actual photographs of IV10 Switchgear taken whilst alive at 11kV under Tropical Storm Test of 54 ins. per hour in our Climatic Laboratory. Ambient temperature 55° C. and 100% relative humidity before storm, dropping to 10° C. after 15 mins. of storm.

YORKSHIRE SWITCHGEAR & ENGRG. CO. LTD. **LEEDS AND LONDON**

ASSOCIATED WITH ELECTRO MECHANICAL MFG. CO. LTD., SCARBOROUGH

POWER and HEATING

400 Kilowatt (600 h.p.)

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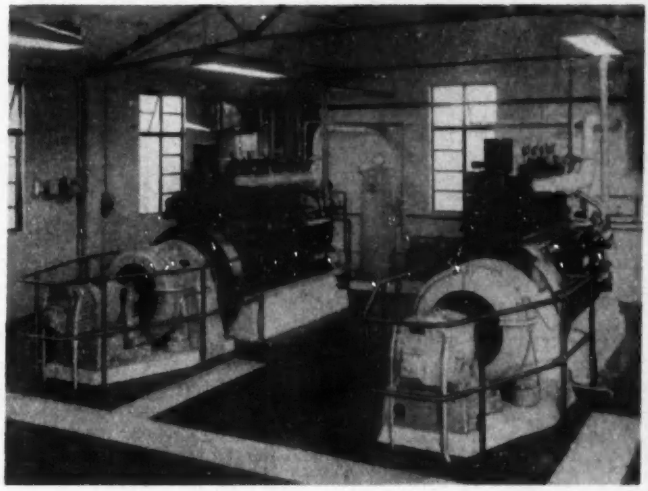

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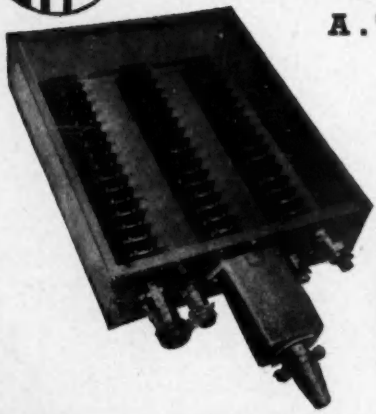

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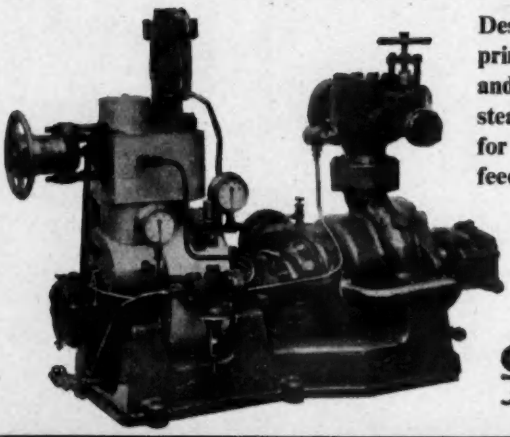

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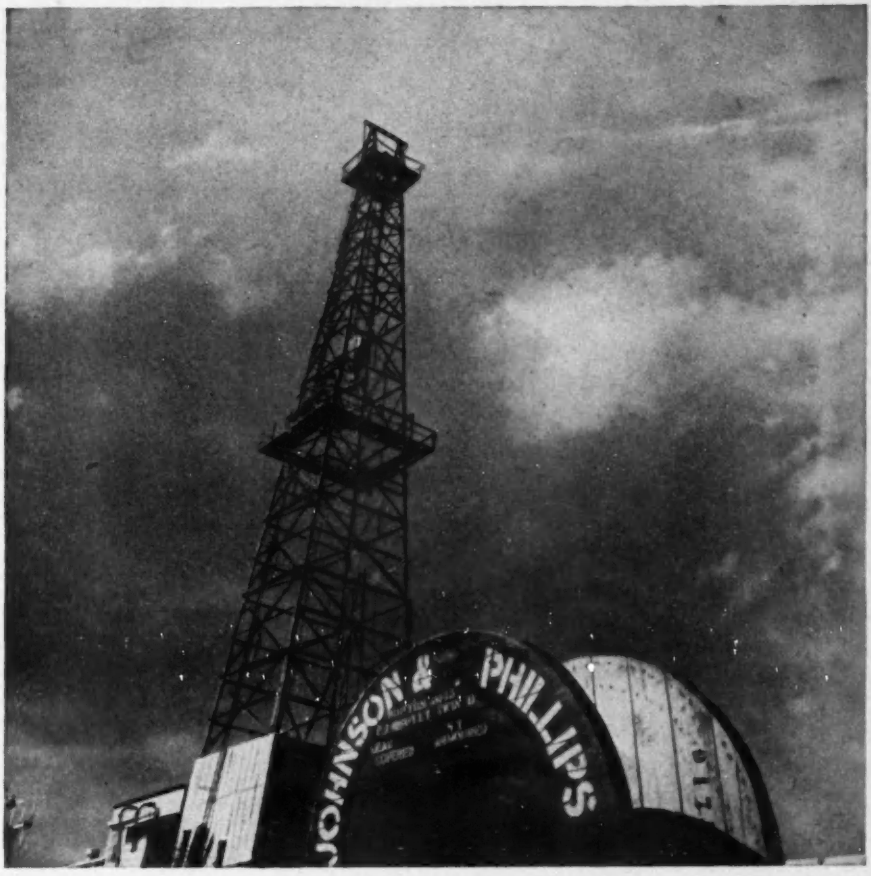

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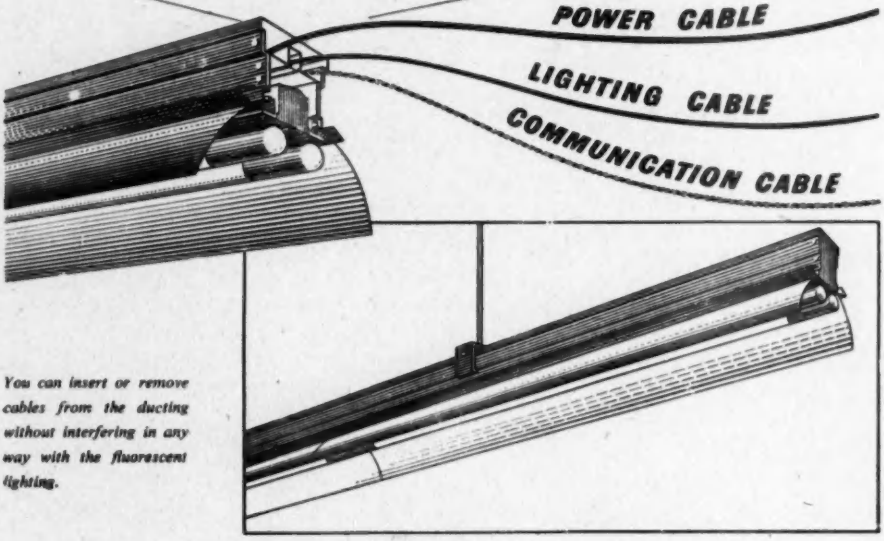

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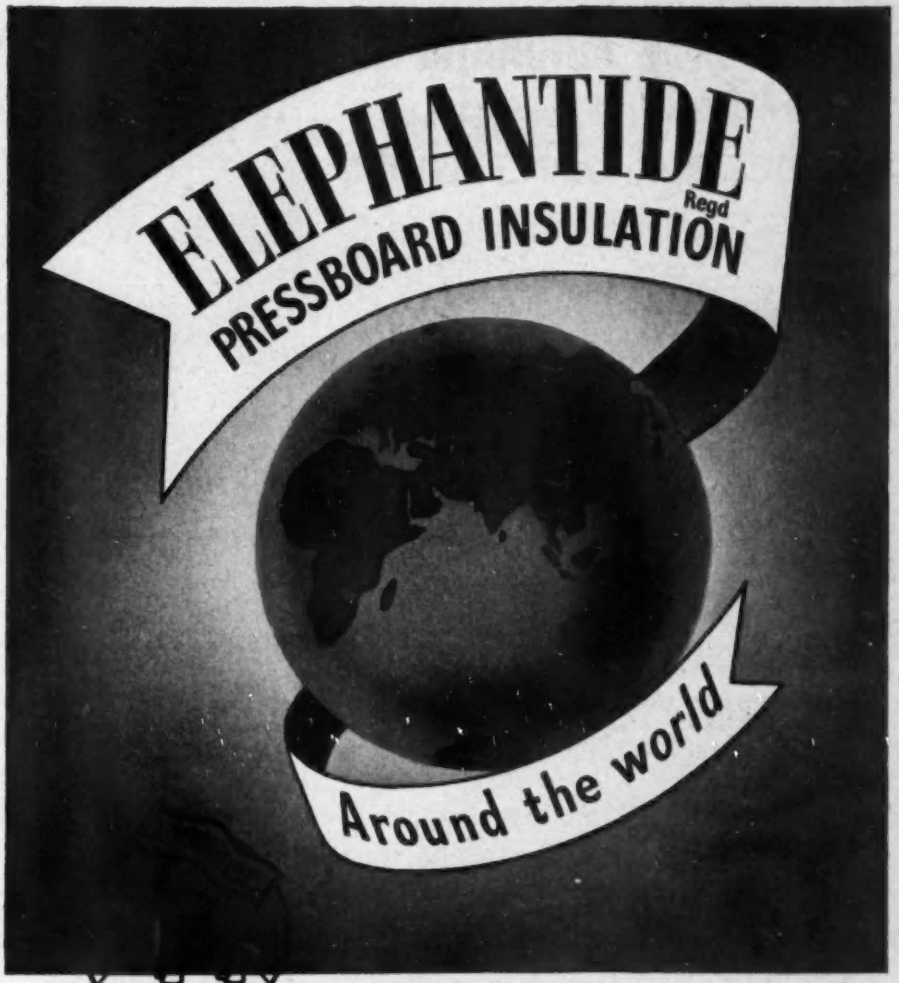

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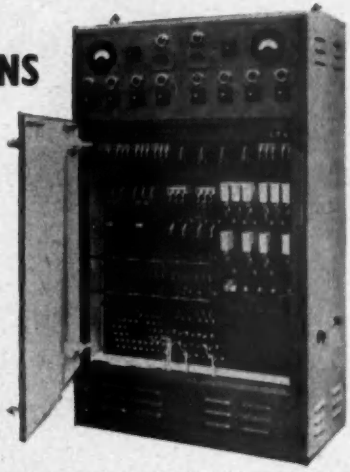

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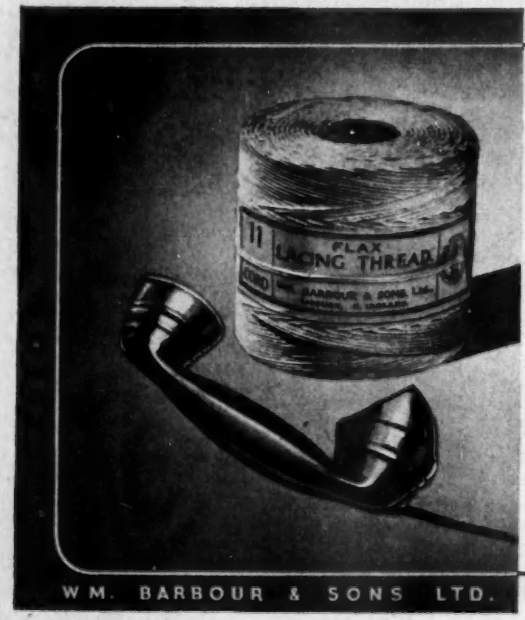

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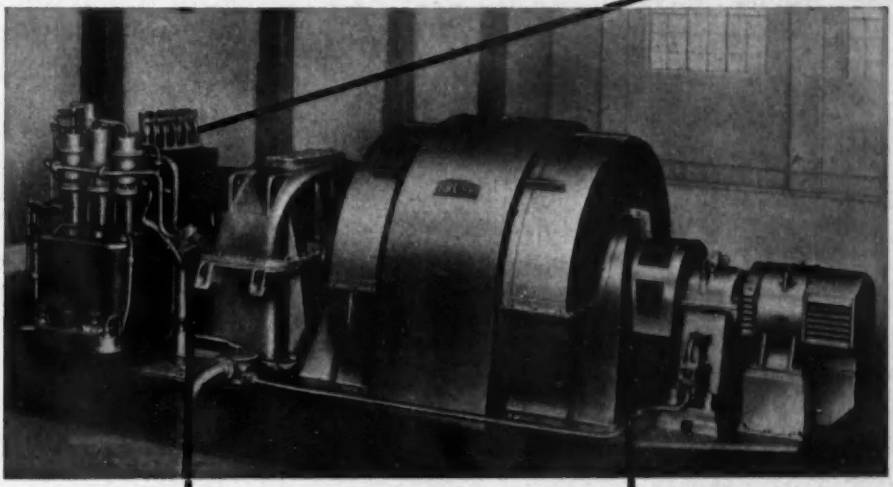

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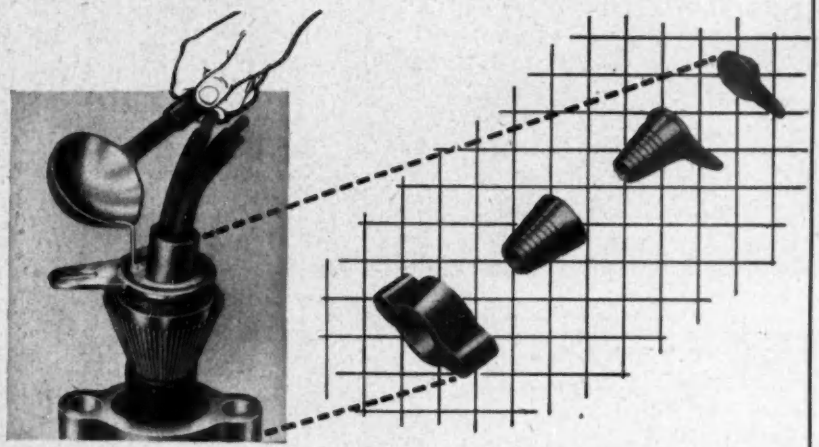

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ELECTRICAL TIMES

Volume 124 No. 3234 29 OCTOBER, 1953

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Editorial

FUEL FOR FIGHTING

FOR any publication that resembles the latest E.D.A. product *Notes for Speakers —Facts about Fuel*, a special welcome is assured in these offices. We have to read so much that is apologetic about the case for using more electricity that the advent of an officially-sponsored pocket-book of fighting ideas positively raises the spirit. The present publication—forerunner of a series—takes the form of a catechism for those who wish to know the right and proper "fuel" for heating jobs. In question and answer form it boldly propounds the arguments on which the electrical case is based, showing no shyness at attacking the claims of competitors. Like all catechisms, it should be valuable not only in sustaining the believer but also in persuading the potential convert. With this in mind there is an improvement that might well be incorporated in succeeding "Notes": more extensive references should be given for many of the facts that are stated. It is not enough to speak in a foreword of basing answers on "official information" and "the calculations of acknowledged experts." The unpersuaded public man into whose hands this booklet is planned to arrive would be happier if he had chapter and verse. It is given occasionally; it could with good effect be quoted more often. But this is a relatively minor matter compared with the significance of this publication as the first real official sign that the industry is at last willing to begin to fight for its rights as the youngest and most virile of the fuel industries should.

HEAPING ON COALS

FACTS about Fuel caused a small storm in the course of Monday's Commons debate on Fuel and Power. Mr. Robens, in his opening speech for the Opposition, found it to contain a misleading quotation; Mr. Nabarro called it scurrilous; and the Parliamentary Secretary to the Ministry of Fuel and Power considered it not to accord with the arrangements arrived at in regard to promotional publicity. What are the facts? The quotation about which Mr. Robens complains is scrupulously accurate, while Mr. Nabarro's condemnation is in the broad general terms he is so adept at formulating. This immediate counter-attack on the E.D.A. Booklet was apparently made in the hope of inhibiting any signs of an upsurgent spirit of electricity. As to the Parliamentary Secretary's doubts about the agreement on publicity, if every statement which an electricity board has a hand in producing is to be subject to Parliamentary scrutiny, then the sooner the agreement requiring this is abandoned, the better. The public have a right to information on matters of general interest, even when the facts revealed are inconvenient to the causes with which some Members of Parliament have identified themselves. The very character of the opposition that this booklet has caused suggests that E.D.A. is at last effectively back on its rightful job.

MEASURABLE COMFORT

IN South East Scotland, pioneering work by the electricity board seems to have secured general acceptance of electric heating by embedded floor and wall panels as an appropriate technique in the design of public buildings. New schools are incorporating this economical heating equipment, while amongst other buildings in which it is used is the first of Scotland's health centres, an Edinburgh installation which is described on a later page. The freedom of treatment which floor heating offers to the architect is used to notable effect in this strikingly designed building, but the advantages that this application of electricity offers are in no way confined to the æsthetic plane. On the severely practical level, there is the absence of

pipes and external heaters, which assists cleanliness; the economy offered by an off-peak demand which attracts a specially favourable tariff; and a pattern of heat distribution that is highly desirable from the comfort aspect. All of these factors are important, but they are too often expressed only in qualitative terms. In the Sighthill installation an attempt is being made to reduce them to quotable quantities. Extensive instrumentation of the building is yielding results in terms of temperature, consumption, and air conditions that should eventually provide valuable data for future designs and, we confidently expect, attractive evidence in favour of this desirable electrical load.

FUSE OR BREAKER?

ONE of the many differences which mark off American installation practice from British is the use of miniature circuit-breakers rather than fuses for the protection of sub-circuits. This practice has obvious advantages: more effective protection is provided against the effects of prolonged overloads, and restoration of supply after a fault has occurred is far simpler and usually safer. On the other hand, circuit-breakers are more expensive than fuses. Now another consideration is becoming prominent to judge by recent papers presented to the American I.E.E. This is the increasing fault potential which is resulting from the continuing growth of distribution circuit capacity. With currents of several thousands of amps liable to flow for some hundredths of seconds in small thermal-capacity appliances and cables before a circuit-breaker will open, attention is being turned to the fuse, which with its quick-action and its current-limiting properties can provide simple but certain protection against this particular danger. The paradox of the situation lies in the marked increase of interest in the circuit-breaker for similar protective duties which is concurrently apparent in Britain. This interest is, of course, mainly prompted by a growing concern with earthing problems, which are of less moment across the Atlantic, where supply voltages are commonly much lower. Thus in both America and Britain there is a changing attitude as to the best method of protecting domestic circuits. Because of the differing conditions, it is unlikely that any common solution will be evolved, but the experiments being made on each side of the Atlantic should be stimulating to engineers on the other.

RECLOSING FOR CONTINUITY

INTEREST in auto-reclosing circuit-breakers for the protection of 11 kV and 33 kV lines has markedly increased in this country in the last few years. More than one of the recent area board annual reports referred to experimental installations in distribution networks, while the unusually severe thunderstorms mentioned in the same reports emphasised the urgency of developing some means of avoiding prolonged supply interruptions as a result of momentary flash-overs. Of course, the application of reclosing circuit-breakers on such lines is not new; nor are they the only solution to the continuity problem. Petersen coil earthing comes at once to mind as an alternative. Nevertheless, it seems probable that auto-reclosing switches will become a common feature of our rural distribution systems in the near future, and with this prospect an enthusiastic report from Electricité de France, made to the United Nations recently, takes on an added interest. French engineers have been experimenting with an auto-reclosing breaker on 10 kV lines particularly exposed to the twin perils of glazed frost in the winter and lightning in the summer. As a result of installing a circuit-breaker which will trip after 0·2 seconds, remain open for 0·3 seconds and then reclose, supply continuity has been greatly improved on lightly insulated lines which had been causing considerable trouble. Of course, there are complications involved in relation to the protection of consumers' appliances, such as the special provisions necessary for no-volt releases, but on the whole the future for reclosing circuit-breakers seems bright.

Meteor

Sighthill Health Centre

ELECTRIC FLOOR WARMING A FEATURE OF EDINBURGH INSTALLATION

By J. W. MOULE, B.Sc., A.M.I.E.E. and W. M. STEVENSON, Assoc.I.E.E.

UNDER the provisions of the National Health Service Act a number of health centres will be built throughout Great Britain, and Edinburgh has been chosen for the site of the first such centre to be built in Scotland. Sighthill, a suburb of Edinburgh, was selected for this experimental centre as it is a new housing area with a considerable population not adequately served by existing facilities. Additional interest is given to this building by the use of electric low-temperature under-floor radiant heating for the main space heating requirements.

The building is planned in the form of a hollow square around a central courtyard (Fig. 1). On the west, south and east of the courtyard are single-storey wings and on the north is a wing of basement and two storeys. The general practitioners' wing consists of six consulting suites each containing a consulting room, examination room and waiting room. The doctors have nursing assistance and the use of a modern laboratory. They are able to arrange for their patients to have remedial exercises under the care of the centre's physiotherapist. On the first floor of the north side there are four fully equipped dental surgeries. Attached to them are waiting rooms, a recovery room, and other ancillary rooms. On this floor also are situated the staff rest and recreation rooms and kitchen. There is a welfare wing and a central common services wing, which includes a gymnasium.

An attempt has been made to create a fresh and non-institutional atmosphere by the use of bright colours in paint, wallpaper and floor coverings. Curtains in non-clinical rooms are for the most part of printed fabrics and the furniture has been kept as light as possible consistent with the wear and tear to which it will be subjected. A variety of floor finishes has been used as the building is of an experimental nature. Floor finishes include wood block, cork tile, thermo-plastic tile, linoleum in sheet and tile form, Fleximer flooring, mastic asphalt and terrazzo. All these floor coverings have been tested by the South East Scotland Electricity Board at one of their premises equipped with floor heating and they all appear to give very satisfactory service under heated floor conditions.

Construction

The plan for the single-storey wings is based mainly on a structural system of pre-cast 7 in. × 7 in. reinforced concrete pillars at 4 ft 9 in. centres with full span beams and

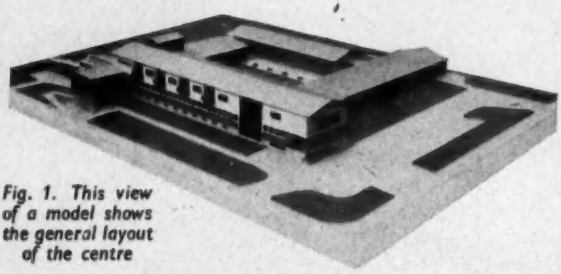
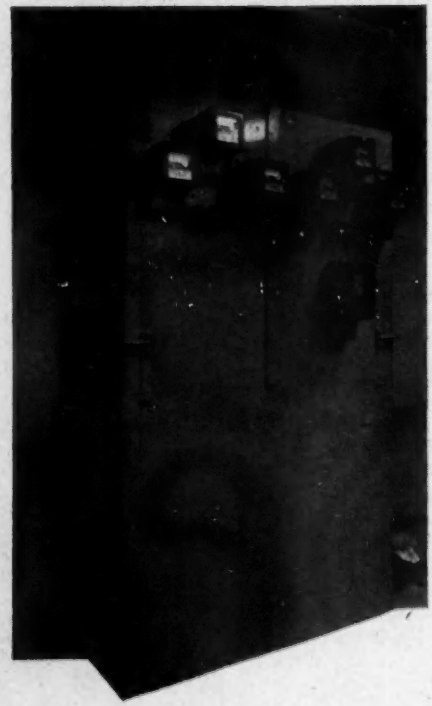


Fig. 1. This view of a model shows the general layout of the centre

trusses. This, with continuous fenestration, facilitates internal adjustments of independent partitions. The use of electric underfloor heating (described later) further simplifies such adjustments.

All floors throughout the building are of concrete construction with the exception of the gymnasium, which is of necessity a hung wood floor. The roof, which is supported on a cold rolled steel framework, is of reinforced Gypklith covered with sheet copper. The roof framework is not supported by the internal partitions but spans between the eaves beams. The walls are of cavity construction, the outer skin of the ground floor being 4½ in. facing bricks with an inner skin of 4 in. foamed slag concrete blocks. On the first floor the walls are 11 in. cavity brick, roughcast on the outside and lined with 2 in. foamed slag concrete block. The internal partitions are of foamed slag concrete block.

Fig. 2. E.B.S. service apparatus and metering



Electricity Supply

Electricity is supplied by the South East Scotland Electricity Board from an adjacent network substation by two 0·4 sq in., 4-core, p.i.l.c.s.w.a. cables run in parallel to a service position within the building. At this service position the Board have installed two sets of service fuses fitted with 400 amp. h.r.c. cartridges and a common busbar from which the "off-peak" and normal supplies are taken. The metering equipment is situated at this service point and the whole of the Board's equipment is enclosed in a Sindanio cupboard built on an angle-iron framework (Fig. 2).

Fig. 3. One of the distribution cabinets. Relays and busbars are in lower section

The electrical installation for the health centre was carried out by Messrs. Drake and Gorham Ltd., Edinburgh, to the instructions of Messrs. Oscar Faber and Partners, Consulting Engineers, London.

In a switchroom adjacent to the service position three main switchboards for "off-peak" (Fig. 4), lighting and normal power supplies have been installed (Fig.4A). The switchboards were manufactured by Messrs. Varilectric Ltd., London, and are fitted throughout with h.r.c. fuses.

In selected positions throughout the building five main distribution cabinets (Fig. 3) by the same manufacturer are fitted for the accommodation of the lighting, heating and power circuits and these are fed from the three main switchboards by p.i.l.c.s.w.a cables. These cabinets are generally situated in cupboards or rooms and not in public passages so that the chance of unauthorised interference with the equipment is reduced. The cabinets make a neat, clean and compact unit.

The distribution from these cabinets is carried out with v.r.i. cables in conduit.

A special feature of this installation is a conduit ring main, in each of the wings, run under the window sills. This comprises three 1¼ in. conduits interrupted throughout their run by special conduit boxes approximately 15 in. × 8 in. × 6 in. deep, having three compartments. This method of installation allows one compartment to be used for telephones, one for lighting and one for power, and facilitates offtakes for these services in any room with a minimum of disturbance and allows certain flexibility in the position of socket outlets.

Space Heating

The type of building construction used ensures good thermal insulation, while the concrete floors provide ample thermal storage for the electric low temperature under-floor radiant system of heating which has been installed. The total loading of 262 kW has been designed for "off-peak" operation. This total installed load comprises 232 kW embedded in the concrete floors and the remaining 30 kW is installed in the form of concealed wall panels.

The installation, which is thermostatically controlled by Satchwell thermostats, has been designed to maintain the following internal comfort effects against an outside temperature of 25°F throughout 24 hours per day with electrical intake only between the hours of 5.30 p.m. and 7.30 a.m., and 11.30 a.m. and 3.30 p.m.: Surgeries, recovery and X-ray rooms, 70°F; other rooms, 65°F; passages and lavatories, 60°F; kitchen, 52°F.

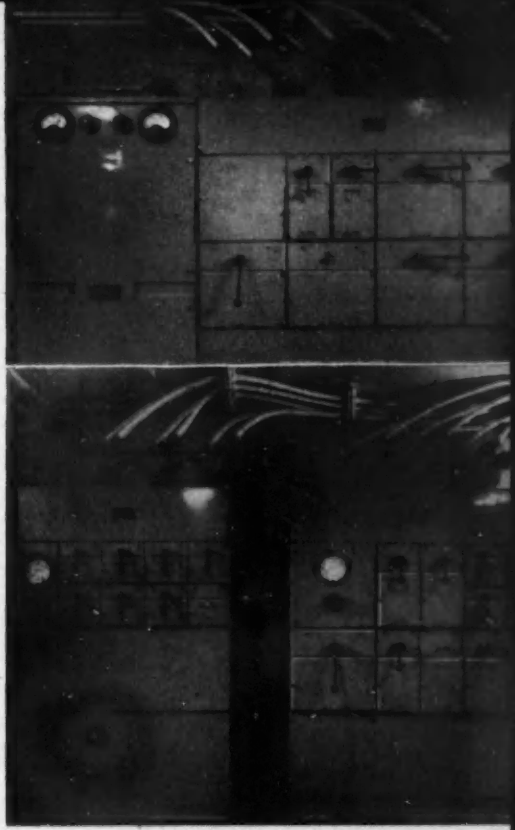


Fig. 4 and 4A. Main "off-peak" supplies switchboard and power and lighting switchboards

MAIN SWITCH ROOM. CIRCUITS AND GEAR

Duty Lighting	Main Gear 150 amp t.p.n. switch-fuse	Feeding Circuits 5-60 amp, 2-30 amp t.p.n. switch-fuses
Off-peak circuits	750 amp t.p.n. contactor time switch operated	3-300 amp, 2-200 amp, 1-150 amp s.p.n. and 1-200 amp, 1-100 amp t.p.n. switch fuses
Normal power	300 amp t.p.n. switch-fuse	3-100 amp, 4-60 amp s.p.n., 1-100 amp and 1-30 amp t.p.n. and 1-100 amp d.p.n. switch-fuses

The heating system, supplied by Messrs. Panelec (Great Britain) Limited, of Reigate, Surrey, comprises "Panelec" Bestos insulated lead sheathed heating cables drawn into aluminium cable housing sections. The housings are supplied with securing clamps by which expanded metal is fixed to serve the dual purpose of a heat diffuser and a key to the floor screed or wall plaster. This construction provides for maximum heat transfer from the cable to the surrounding concrete and other building materials. Floor panels are fabricated on site (Fig. 5) by laying the cable housings on the sub-floor at intervals of 9 in. to 12 in. according to the required room temperature. At the ends of each panel, cable troughs are provided to accommodate joint boxes. The troughs are formed either by shuttering or are supplied as metal troughs complete with covers which are designed to take the finished floor surface thus allowing the trough covers to blend with the remaining floor finish.

The heating cables are usually about 75 ft long with a loading of 10 watts per foot run, and the installation is designed to ensure that the maximum floor temperature will not exceed 73°F.

The wall panels (Fig. 6 and 7) are supplied prefabricated and are recessed into the

walls so that when finished they are completely concealed (as seen in Fig. 7A). They operate at a maximum surface temperature of 110°F, and are backed by a heat-reflecting material and also, in the case of outside walls, by an insulating blanket. Similar removable covers to those in the floors are arranged to accommodate the plaster and are fitted to the concealed wall panels, thereby giving access to all connections, should the necessity arise at any time, without disturbing adjacent building work or decorations.

The entire heating system is automatically controlled by thermostats and the electrical intake is limited by a time switch to "off-peak" hours. Complete concealment of the heating equipment in the floors and walls leaves the interior of the building free from the protuberances normally associated with conventional heating systems.

A further advantage of using this method of heating in buildings such as the health centre is that convection currents are dedecreased with the result that airborne infection is reduced to a minimum. By using this totally concealed all-electric radiant warming system the centre not only enjoys internal comfort with cleanliness and hygiene, but it also makes a valuable contribution to the improvement of public health by avoiding pollution of the atmosphere by the products of combustion of coal, gas or oil.

As the gymnasium has a wood floor and is unsuitable for the storage type of heating, four 1 kW radiant panels have been installed on the walls. Likewise, in the changing and X-ray rooms additional heat is provided by such panels. In other cases "Unity" holoplast heating panels incorporated in partition walls give a very pleasant warmth to the occupants. In the water tank room frost protection is afforded by 1·2 kW of tubular heaters which are thermostatically controlled and set to operate when the outside temperature falls below the predetermined thermostat setting.

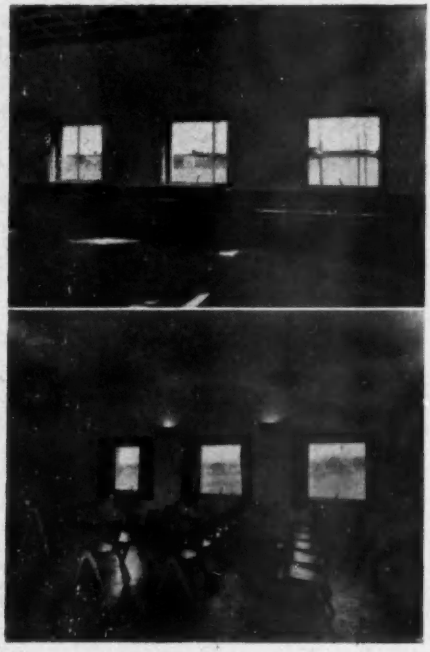


Fig. 7, top, shows a continuous wall panel in a lecture room, with the completed room seen in the lower of the illustrations, Fig. 7A

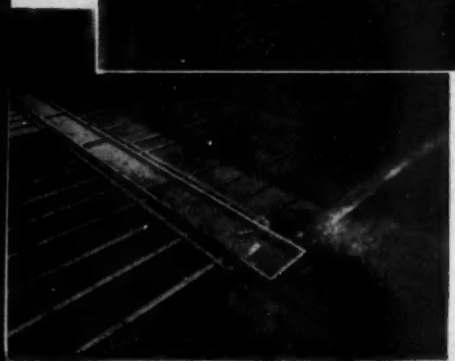


Fig. 5, bottom left. Cable housings and expanded metal covering prior to screeding. In the centre is seen shuttering for a trough. Fig. 6, above shows a small wall panel with heating cables and terminal boxes wired. The expanded metal covering is not shown in this view

Hot Water Supplies

The domestic hot water is afforded from two 500 gallon water storage heaters (Fig. 8) manufactured by Messrs. Duncan Low Ltd., Glasgow. The cylinders are 48 in. diameter × 75 in. high, tested to 35 lb/sq in, and each is fitted with two 30 kW, 415 V, 3-phase, 4-wire immersion heater batteries consisting of copper tubes welded to a gunmetal flange for bolting to

complementary flanges on the cylinder. The elements are of the removable type. The cylinders are adequately lagged with 3 in. thick insulation and protected by a cream enamelled sheet steel casing. Each immersion heater battery is controlled by a thermostat and a 3-pole, 50 ampere contactor. 3 in. inlet and outlet and 2 in. secondary return connections are provided on each cylinder, together with the necessary relief valves, inspection doors and dial thermometers. The domestic hot water is stored at 170°F and is circulated throughout the building by two fractional horse power circulating pumps.

The sterilising equipment (Fig. 9) for the centre has been supplied by Messrs. Dent and Hellyer Ltd., London, and comprises a horizontal high pressure and vacuum dressing steriliser 30 in. diameter × 48 in. long and electrically heated by three 5 kW immersion heaters housed in a steam generator slung below the steriliser body. The steriliser body and the steam generator are constructed of copper with a cast gunmetal shroud. The steam generator is normally filled by an injector but there is also an alternative manual control.

Two hot and cold water sterilisers (Fig. 10) are mounted one above the other behind the control panel and each has a working capacity of 10 gallons. Each steriliser is heated by a 5 kW thermostatically controlled immersion heater operated from push buttons on the control panel.

A combined bowl and instrument steriliser is installed beside the control panel, the bowl compartment is heated by two 4 kW immersion heaters with automatic low water cut-outs and controlled by three-heat rotary control switches complete with pilot lights. The instrument compartment is heated by one 4 kW immersion heater with similar features. Switchgear and pilot lights of both compartments are incorporated in one panel mounted on the adjacent wall.

Fig. 8. Domestic hot water storage heaters, showing the two motor driven circulating pumps

For the destruction of soiled dressings, etc., a 6 kW central incinerator has been supplied by the General Electric Co. Ltd. The equipment is provided with a separate wall mounting control panel which consists of a process timer, indicator light and main switch-fuse.

Artificial Lighting

The lighting installation in the building comprises some 457 points with 12 street-lighting units in the grounds. While the lighting of the building is mainly by tungsten filament lamps there are 40 fluorescent fittings

Fig. 9, left. Dressings sterilising equipment panel and controls, with bowl and Fig. 10, right, hot and cold sterile water heaters

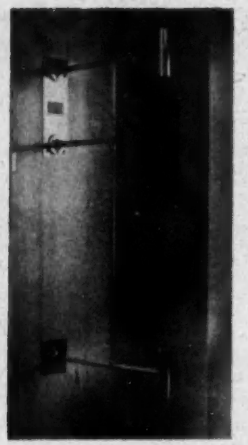


Fig. 11. Research equipment for determining effectiveness of heating arrangements

installed in selected positions. Considerable thought has been given to the selection of fittings to harmonise with their surroundings; for instance, the passage fittings in each wing are of metal construction in varying colours, one colour for each particular wing. Considerable use has been made of wall brackets to give indirect lighting in many of the rooms while the staff room has three 5-light pendants with champagne buckram shades which give a very pleasing effect.

Heating Research

The South East Scotland Electricity Board, in conjunction with the British Electricity Authority Research Laboratories, Leatherhead, intend to carry out research on the electrical heating of this building. The Department of Health for Scotland are co-operating in the research work and have made the fullest possible facilities available in this connection.

During the construction of the health centre opportunity was taken to install 24 thermo-couples in the north-west section of the building, and these thermo-couple temperatures will be recorded by a Cambridge Quick-Acting Recorder. At selected sites in the Enquiries Office, Porter's Room, Chairside Assistant's Room and Pharmacy Store the thermo-couples, mounted on suitable wall brackets and floor standards (Fig. 11), will record the wet and dry bulb and globe temperatures. Thermo-couples have also been embedded in the floors and ceilings and provision has been made to record wall temperatures if required. In addition, a Stevenson screen has been erected at a point remote from the building to obtain complementary recordings of outside wet and dry bulb and ground temperatures. This instrumentation will provide continuous records of the building heating behaviour. These records, together with the electrical consumption for the section of the building under test, will provide valuable data relating to this method of heating.

Acknowledgments

Thanks are expressed to the following who have co-operated and supplied information relative to this installation:—

The Chief Architect, Department of Health for Scotland.
Messrs. Oscar Faber and Partners, Consulting Engineers, London.
Messrs. Drake and Gorham Ltd., Electrical Contractors, Edinburgh.
Messrs. Panelec (Great Britain) Ltd., Surrey.
Messrs. Dent and Hellyer Ltd., London.
The General Electric Co. Ltd., Edinburgh.
The South East Scotland Electricity Board.

Facts about Fuels

FIRST of a series of speaker's notes being produced by EDA, "Facts About Fuels," sets out to answer questions commonly raised when the comparative merits and overall efficiencies of electricity, gas, and solid fuels are under discussion. This lively field of enquiry is tackled in question and answer form, with an emphasis on specific quantitative statements rather than general unsupported opinions.

Subjects covered in this 23 page booklet which really does fit into the pocket, are sources of power, production, efficiency, distribution, demand patterns, the non-domestic use of electricity, alternative methods of coal-saving, load balancing, tariffs, atmospheric pollution, and the proposals of critics of electricity.

Special attention has been paid to providing answers to the allegations commonly made when electricity is under attack. This is only the first of what is promised as a series of speaker's notes on appropriate subjects.

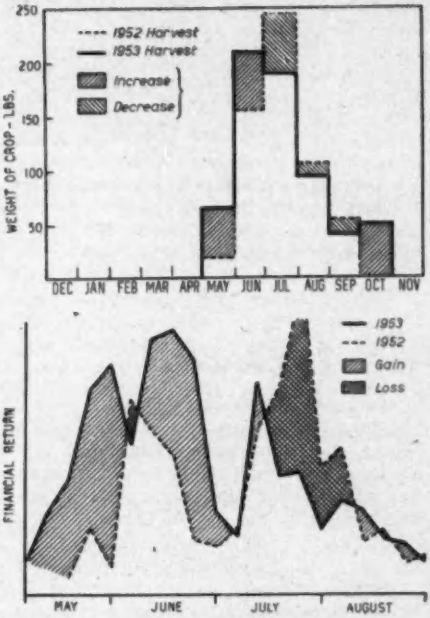
The booklet has been sent to all Members of Parliament, and to 300 members of the House of Lords, in the hope that it may be of service to them in the course of their Parliamentary activities. It was referred to during Monday's House of Commons debate on the nationalised fuel and power industries, when complaint was made by some Members of Parliament that unreasonable statements were made in the booklet. The Parliamentary Secretary to the Minister of Fuel and Power then suggested that it was not composed on the lines of the arrangement the Minister had made with the electricity and gas industries about advertising and publicity. He intended to make inquiries.

Electricity's Aid to Tomato Growing

Results of this Year's Harvest Show Value of Plant Irradiation

By E. C. CLAYTON

A DESCRIPTION of an installation employing high pressure mercury vapour lamps for the irradiation of tomato plants was given in the ELECTRICAL TIMES dated December 11, 1952. The harvest is now virtually complete and the results are given in the hope that they may be of interest to those concerned in planning similar installations for next season.



Figs. 1 & 2 compare the harvest of two years and the increased financial return for 1953 against that of 1952

Seven lighting fittings were employed at Deanlands Nurseries, Vines Cross, Sussex, and they were mounted on a movable overhead track so that two batches of 1,200 plants could be irradiated for twelve hours each in every period of twenty-four hours. The first batch of tomatoes was sown on October 30, 1952, pricked out into peat pots and irradiated from November 10 until December 19. The plants were then set out on the side benches of the house for a further week prior to planting on December 27 in their permanent quarters. The condition of the plants at this stage was so remarkable that it caused some highly complimentary remarks to be published in the Trade Press at the time.

First Setting-out in February

First fruits were set on February 2, 1953, and the first ripe tomato was picked in the middle of March. A market consignment was despatched on March 30, and by the first week in April most local retailers had tasted their first English tomato of the season as a goodwill offering from their wholesalers. Considering the unprecedentedly long cold winter, the reduction in natural light due to fog and the relatively low temperatures maintained in the glasshouses, this is considered, by growers, to have been a remarkable achievement.

The good results from the first batch of plants were matched by results from succeeding batches. The plants from seeds sown on December 10, 1952, were pricked out and irradiated from December 20, 1952, until January 17, 1953, the plants being set out in the glasshouse on January 31. Last season, in the same house, seed was sown on December 7, 1951, but the plants could not

Fig. 3 shows the use of a 2·5 kVA "Loheat" transformer for soil warming. In the circle can be seen the external connectors to one of the tomato beds. "Farmer & Stock-Breeder" photo

be put out until February 15, 1952. The use of artificial light, therefore, had the effect of reducing the time from seed sowing to planting from 71 days to 52 days, a saving of 19 days, which resulted in a considerable reduction in the amount of fuel required for providing the necessary warmth in the depth of winter.

Work at the John Innes Horticultural Institution by W. J. C. Lawrence had led growers to expect an early crop increase of between 50 and 70%, and for the total yield to be increased by some 10%. Figure 1 shows how nearly these indications have been fulfilled, the early crop having increased by 58% and the total crop by just over 10%.

Soil Warming

One of the glasshouses lies in rather a cold situation so electrical low voltage soil warming equipment was installed for warming the beds prior to planting out. A series-parallel grid of galvanised iron wires buried 1 ft deep in the soil is fed by means of a "Loheat" 2·5 kVA transformer at 30 volts (Fig. 3). A satisfactory soil temperature of 58° F was achieved in 48 hours from an initial temperature of 46° F. Pipe heat, instead of being put on fourteen days in advance of planting was, in this instance, not applied until the day before. The two weeks saved represent a considerable degree of fuel economy.

Moreover the grower believes a significant proportion of the total yield is due to the fact that the plant roots are at once able to develop to a much greater depth than is possible in soil warmed by top heat only. The resulting large root system is thus able to support a heavy crop. Four beds are supplied from this single transformer each bed being pre-warmed in turn; maintenance warming is then effected by moving the transformer from one bed to the next at periods of 12 hours.

When every effort is being made to increase productivity and, at the same time, reduce costs, it can be seen that the techniques described make an appreciable contribution in this direction. It is a further instance of how the wise use of electricity can help in reducing consumption of solid fuel.

Our readers' views . . .

Who Paid?

IN connection with the Sunday rail tour of Breconshire, enjoyed so much recently by the I.E.E. Supply Section, I fail to see any particular enjoyment in having "stations and signal boxes especially manned for this tour." What loss was sustained by British Railways, or did the I.E.E. pay up on a double-time basis?

Surely it is time to realise that the public are weary of "Nationalised" charges and, to say the least, your report creates a mighty bad impression.

A. Ian Buchanan

GLASGOW

◆ ◆ ◆

Amateur Wiring

AS a practical electrician, I appreciate the true value of the efforts being made by the Kirkburton urban council and others, to wipe out wiring by amateurs.

At the same time, I would like to see withdrawal of "How to do it" pamphlets, as these are the usual source of information, and to most handymen, are misleading.

In conclusion, the necessity for these additional points all comes back to the fact (as "Megohm" so often writes in his "Notes on Wiring") that insufficient plugs and lights are installed initially by councils, so permitting rents to be a little less—but at the same time increasing the risk of fire and electric shock.

D. H. Stewart

LONDON, E.C.1

◆ ◆ ◆

Hospital Electrical Hazards

ALTHOUGH the use of semi-conducting rubber as a prevention against sparking is a most useful factor in promoting safety in hospital operating theatres, an added precaution against the local building up of static charges is that of ionising radiations. While details of this system—using radioactive thallium—were given by Mr. A. Quinton in the Static Electrification Conference, I notice it was not included in Mr. Palmer's article in your issue of September 10. Possibly, however, this matter requires further investigation before it can be introduced generally.

P. Jones

LONDON, W.C.1

Garage Lighting at Stockwell

CONSTRUCTED as an integral part of the London Transport Executive's scheme to replace London's trams by buses, Stockwell garage is due shortly to be brought into full use. Architecturally the garage is unique, as can be seen from the lower illustration, whilst its electrical installation for lighting has interesting features.

An outstanding contemporary example of the use of reinforced concrete as a structural medium, the main building is 392 ft in length comprising double-hinged arched frames spanning 194 ft and spaced at 42 ft intervals along the length of the garage. Connecting each frame are vaults which, struck to a radius of 27 ft, cantilever from the arch ribs to permit an area of natural lighting of 140 ft by 14 ft in each 42 ft wide bay. Both vaults and arches are in reinforced concrete.

Artificial lighting for movement over the entire floor area is provided by continuous runs of 8 ft, 75 W Metrovick fluorescent lamps. A run comprises 22 lamps following the arch of the main ribs, there being a run on both sides of each rib. Lamps are supported by simple channel box units mounted directly on to the ribs, each box housing quick-start transformer and p.f. correction capacitor for one lamp. Supply cables and earthing wire are run in connecting channel.

Horizontal illumination at floor level is approximately uniform and averages between 3 and 4 lumens/sq ft, whilst on a bus parked in a row 6 ft from other rows, vertical illumination is 1·25 L/sq ft at floor level and 2 L/sq ft at six feet above ground. In the servicing area, the horizontal illumination at floor level is increased to some 13 L/sq ft by the use of 16 supplementary trough fittings run continuously, 10 ft higher than the side units in three of the bays. Each fitting houses three 75 W fluorescent lamps connected to different phases of the supply.

Main switchgear for the complete electrical installation was also supplied by Metropolitan-Vickers Electrical Co. Incoming three phase supply at 440 V is received at a type MC

The heading illustration shows the well-lit interior whilst that on the right indicates the garage's striking appearance

metal-clad unit distribution switchboard which controls all lighting and power supplies in the garage. A 500 A fused switch, type MC, isolates the supply, whilst other units of the same type control outgoing circuits, the latter ranging in size from 60 A to 200 A rating. Apart from the L.E.B.'s metering equipment and c.t.s, instrumentation provided for on the board includes a watt-hour meter registering garage lighting consumption together with a 4-in. dial ammeter and phase selector switch. Both electrical and lighting installations were designed by J. H. Coombs and Partners, electrical consultants for the work.

Equipment in use at the garage includes two vacuum cleaner installations for bus cleaning. The larger, a 40-h.p. installation in the servicing area, allows eight operators to work simultaneously. Both decks of buses at each of the four servicing areas may thus be cleaned at the same time. In the docking area, a 10-h.p. cleaner connected to each of the seventeen pits provides facilities for periodic upholstery cleaning. Compressed air at 90 lb/sq in. is supplied from a ring main whilst, for tyre inflation a supply at 200 lb/sq in. is provided. Three compressors, each of 24 cu ft/min capacity at 200 lb/sq in. feed the installation, single reducing valves being used to supply the lower pressure. An electrically operated pumping system is used to transfer waste oil from underground tanks (where it collects under gravity from the garage) to storage tanks. Thermostatic control of heating is employed, whilst fumes from both bus engines and battery charger are removed by extractor fans operating in two separate systems.

Fuel Debate in Commons

REPORTS of the nationalised fuel and power industries were debated in the House of Commons on Monday. The occasion was no narrow examination of outdated documents, however. Rather it looked forward to the problems of the future, following the example set in the opening speech by Mr. Geoffrey Lloyd, the Minister of Fuel and Power.

Mr. Lloyd after referring to the coal stocks position and to N.C.B. reorganisation, went on to deal with electricity. He praised the B.E.A. for its improvements in thermal efficiency, and went on to say that about 50 MW of power should become available from the new breeder reactor at the Calder Hall nuclear establishment. He would not tell Mr. A. M. F. Palmer, however, if the B.E.A. would have complete control of future atomic power stations. Amongst other points he mentioned was the setting up of a fuel efficiency company (see page 828), as recommended by the Ridley Committee and others.

Mr. Robens, opening for the Opposition, was fearful that load spreading and load shedding might return if the power station construction programme were not stepped up. He went on to attack "Facts about Fuel," a new E.D.A. publication, for alleged unfair quotations, and also area board "commercial managers" for advising that no gas should be laid on a housing estate.

Two members had a lot to say about the B.E.A. during the general debate. Mr. G. Nabarro attacked the Authority for allowing its load factor to fall, and he also disapproved of the release of promotional advertising. He queried whether it was wise to dispense with load spreading in industry. Mr. A. M. F. Palmer, who spoke later, was more concerned with the organisation of the industry. He thought that the Authority should have a few experimental power stations of its own, in order to train its engineers. On another semi-technical point, he questioned the number of consulting engineers employed by the B.E.A., suggesting that they might be unnecessary. Other points he made covered the possible desirability of appointing "outsiders" to the boards of nationalised industries and the alleged ineffectiveness of part-time members of such boards. Finally, he restated his belief that consumer choice is perfectly compatible with public ownership and socialisation. Co-ordination of all fuel industries would be unlikely to improve thermal efficiency.

In replying to the debate, Mr. L. Joynson-Hicks (Parliamentary Secretary to the Ministry of Fuel and Power) emphasised the importance of keeping down the capital cost of new power stations. In dealing with Mr. Nabarro's complaints about load factor, he said that if it were to be improved, promotional publicity must be permitted. But he thought that the E.D.A. booklet was not composed in accordance with the lines of the arrangements arrived at between Ministry and nationalised boards, as to the nature of the publicity to be sent out.

Does it Pay the Farmer to ELECTRIFY?

INVESTIGATIONS INTO COMPARATIVE COSTS GIVE THE ANSWER

By D. H. SMART,* B.Sc.(Eng.) A.M.I.B.A.E.

PART II

IN Part I of this article, some figures were given of the comparative cost of electricity and other fuels for powering farm operations. Further examples are given in the present Part, while all the figures are summarised in the table on page 808. It must be emphasised again that the costs of petrol, gas oil and lubricating oil are not the same throughout, due to some farmers buying in bulk and others in small quantities. Moreover, the figures collected cover different periods and are, therefore, affected by price changes.

Motive Power

One farm visited had quite recently installed a 15 h.p. electric motor to drive the fan of a crop drying plant. Previously a 16 h.p. diesel engine had been used. Careful records had been kept on the farm of oil fuel consumed and as the supply to the motor is metered separately it has been possible to make an accurate comparison of the costs by the two methods.

During the 1952 drying season an average of 6½ gallons of gas oil and two pints of lubricating oil was used daily and cost:

	s.	d.
6½ gallons gas oil at 1s. 8d. per gallon	10	10
2 pints of lubricating oil at 4s. 3d. per gallon	1	0
	11	10

The corresponding costs of driving the fan by the electric motor are working out, during the present season, at 10s. 9d. per day for 129 units.

Apart from finding himself in pocket the farmer is very alive to the other advantages of the electric motor and, quite spontaneously, gave the following:

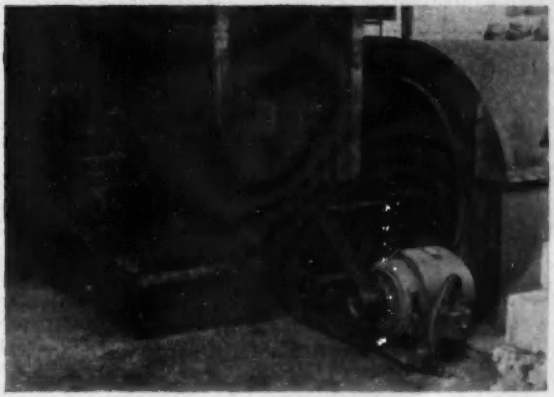
(1) The time wasted and the cost of repairs to the original diesel plant have been eliminated. It is now possible to budget without the annual figure for overhaul which is so necessary with the diesel engine running for "two shifts" during the grass drying and grain harvesting seasons.

(2) The cost of labour, for operating the drier, is reduced. Not having to fill an engine with gas oil, lubricating oil and water saves, in the farmer's estimation, at least 2s. 6d. per day in labour charge.

(3) Over the years everything around the diesel engine has become covered with a thick deposit of oil and dirt, which gets on the operator's hands and clothes. Now with the electric motor the dirt can be eliminated.

The workers also appreciate the electric

The electric motor drives the grass-drier fan. The now unused diesel engine is seen in the background



* Headquarters Development Section, South Western Electricity Board

drive. Not only is it now cleaner to work, but it is more pleasant without the monotonous "chug" of the diesel engine. The noise factor was an unusual and unexpected consideration on the farm.

Taking the farmer's estimate of the reduction of labour into account, the total saving, brought about by the new fan drive, is 3s. 7d. per day.

Water Pumping

Although a mains water supply is ideal on any farm, it can prove to be very expensive. In some places in the South-West mains water can cost as much as 2s. 10d. per 1,000 gallons. At a conservative estimate a dairy farm can use easily 1,000 gallons a day—£52 a year for water only.

There are very few farms where an adequate natural water supply is not available, and although any mechanically driven water pump will "pay dividends," there are even greater advantages in using an electrical drive.

As before, figures are taken for two farms. At the first farm two 500 gallon tanks are mounted in the loft of a barn with an overflow into the yard. The replenishment of the storage tanks entailed a long walk to the pump site to start up the petrol engine, a return to await signs of overflowing and a further walk to shut down. Clearly an unnecessary waste of time and particularly unpleasant in the winter. Ignoring the time wasted the cost of operating the petrol driven pump was 9d. per day.

What would it cost for electricity to do the job? A liberal estimate shows this to be in the region of 5d. per day. Therefore a saving of £6 per year can be obtained with the electric motor. What, of course, is more important, time can be saved and an irksome task eliminated.

There and then the farmer decided to replace the petrol engine by an electric motor and have the system made automatic.

The other installation visited supplies two farms. The pump refills a 6,500 gallon reservoir which feeds both farms. The total "lift" is about 400 feet, to cope with which a piston pump is used.

Before mains electricity was available in the district the pump was driven by an engine which was started with petrol and then operated with T.V.O. The farmer preferred to drain the sump every four weeks and refill; this resulted in a relatively large use of lubricating oil.

During the last year of operation of the engine, 189 gallons of T.V.O., 46 gallons of petrol and 14 gallons of lubricating oil were used. This gave a total cost of

189 gallons of T.V.O. at 1s. 6d. per gallon	£14
46 gallons of petrol at 4s. 0½d. per gallon	£9
14 gallons of lubricating oil at 5s. 5d. per gallon	£4
	£27

Only rare visits are necessary to pumping stations which are equipped with electric drives

The pump was so far away from the "parent" farm that a separate service and meter had to be provided. From the point of view of the investigation this was ideal since an accurate figure of electrical cost was readily available.

During the four quarters preceding the visit 1,170 units had been consumed; the accounts amounted to £10 12s. 10d.

Once again, the saving was amazing, but even more significant was the fact that if the pump had been near enough to the farm to be serviced from it, as it is in most cases, then the operating cost would have been only £4 5s. 4d. for the year since all the units consumed would have been charged at the low running rate of the block tariff.

On this farm the actual saving on running was not the only benefit. During the last three years of operation of the petrol engine £20 had been spent on repairs and replacements. The saving in time and greater convenience were even more important. When the engine was used the occupier of one farm 250 yards from the borehole visited the pump-house every other day to start the engine. This was not, in any way, a congenial task, and it was even worse when the engine gave trouble. To quote the farmer, "I've started up the engine many times and then reached the top of the hill on my way back when I've heard it stop. Back down the hill again to have another go." Nothing can be more irksome to a busy farmer than to have to waste time continually starting up a temperamental engine.

Now that the pump is driven by an electric motor the whole operation is controlled by a time switch and only an occasional visit is made to the pump to see that everything is in order.

Milling

Enquiries made in the South-West reveal that the farmer who has his grinding done by the local miller has to pay from £2 to £3 10s. per ton for collection, grinding and delivery. However, these days, most farmers have a mill of one sort or another and if it is a large plate or hammer mill it is more than likely that the tractor is used as the power unit. During the winter it is quite convenient to "couple up" some time during the day for grinding, but when the tractor is needed for field operations, particularly at harvest time, it must be annoying to have to spend valuable hours producing meal. There is also the question of labour. With the mill driven by a tractor a man has to be in attendance the whole time.

This mill is started by pressing a button

Now the small horse-power automatic hammer mill can cope with the needs on most farms. This small mill has advantages from both the farmer's and the Area Board's point of view. From the farmer's angle the hopper can be filled at any convenient time and once the mill is started it needs no further attention. The initial capital cost is low compared with the "big brother," the large hammer mill. The advantage to the Area Board is that the installed load can be kept low, thereby reducing the distribution cost by making possible a smaller transformer and smaller conductors. This lower cost will also be reflected in the farmer's connection charge.

It is difficult to give actual figures of saving but electricity can "cut the cost." With the average unit price on farms in the South-West the cost of producing a normal grist with the small electrically driven automatic hammer mill, would not exceed 3s. 6d. per ton. Compared with the miller's figure this is remarkable. When the cost of running a tractor is considered, with DERV almost as expensive as petrol, the high price of the tractor belt (one farmer had just bought a new belt at £22) and the farm hand in continuous attendance there is little doubt that the electrical method is far cheaper than the tractor drive.

Other Electrical Applications

There are, of course, applications of electricity, in and around the farm, where the financial benefits cannot be easily assessed. Although such cases are numerous, once again just two examples will be considered.

It is difficult to give direct figures of saving for such uses as floor warming or infra-red heaters for pig farrowing, yet there is no doubt that overlaying can be almost eliminated by these methods. The question of any advantage for rearing is debatable, but one farmer in the South-West has installed 28 kW of floor warming in his farrowing and fattening pens, and to quote his own words, " I don't care what the experts say on this subject, since I've installed floor

COMPARATIVE OPERATING COSTS ON FARMS AS SET OUT IN THE TWO PARTS OF THIS ARTICLE

Farming Operation	Pre-electrical Cost	Cost with Electricity	Saving with Electricity
Generation of Electricity ...	(a) £219 (gas oil) (b) £34 (gas oil)	(a) £81 (b) £37	(a) £138 per annum (b) hot comparable
Mechanical Milking... ...	(a) £32 (petrol) (b) £29 (petrol)	(a) £8* (b) £8*	(a) £24 per annum (b) £21 per annum
Steam Raising	(a) £125 (coke) (b) £273 (oil)	(a) £45† (b) £192	(a) £80 per annum (b) £81 per annum
Milk Cooling	£2 10 0 per week (petrol)	18s. per week†	£1 12 0 per week
Lighting	£5 13 0 (paraffin)	£1 1 0	£4 12 0 per annum
Food Boiling...	£47 (coal)	£23†	£24 per annum
Water Pumping	(a) £13 14 0 (petrol) (b) £27 (T.V.O.)	(a) £7 12 0* (b) £10 12 10	(a) £6 per annum (b) £16 per annum
Motive Power	14s. 4d. per day (gas oil)	10s. 9d. per day	3s. 7d. per day
Food Mixing...	£114	£25	£89 per annum

* Estimated † Calculated

heating in my pens I've suffered no losses due to chills and I'm sure that fattening doesn't take as long."

Mechanisation of farming operations has been proceeding rapidly for many years yet never has the pace been greater than at the present. The horse has practically disappeared from the farm as a work animal and with the tractor has come an array of implements each liable at some time or the other to need the attention of an agricultural engineer.

The need therefore for the farmer to be a fairly competent mechanic has been recognised by the National Federation of Young Farmers' Clubs. As a result, at the main agricultural shows, competitions are arranged in which the teams have to carry out minor repairs to farm implements.

The realisation that being able to carry out at least small repairs can save time and valuable man-hours, especially during the harvest period, has almost forced the younger farmers to become mechanically minded. It follows, therefore, that a well-equipped workshop will be one of the farm necessities of the future.

It is difficult, if not even impossible, to visualise a farm workshop without electricity. Although the larger drill or grinder can be driven by some other means, electricity scores in a number of ways: extremely low running cost, the convenience of starting by just pushing a button and what is even more important being able to use portable tools such as the drill, grinder, sander or saw. In addition, of course, electric lighting facilitates the carrying out of repairs after dark.

Conclusion

Apart from the last section, this article has been almost completely devoted to the actual financial benefits to the farmer. From the pre-electrical and electrical costs given one overwhelming conclusion can be drawn. The majority of farming operations capable of electrification can be carried out more cheaply through this medium. There are, of course, other equally important advantages to be obtained from electro-farming.

Saving in Labour

Electrically operated bottle washers and fillers, food boilers, mills and crushers, hoists and mechanical conveyors, milking machines, food mixers, poultry pluckers, pumps and sterilisers are just a few of the appliances which will assist the farmer to conserve his labour force.

Increased Productivity

While the saving in labour automatically permits a relative increase in the farm's productivity, there are, in addition uses of electricity which directly increase output.

The electric fencer, used for controlled grazing, is fast becoming the farmer's most useful asset in conserving his cattle feeding resources. The fencer itself is generally operated from a battery; the battery charging, however, can be done economically and conveniently by the small mains operated battery charger.

The chilled water milk cooler can also assist production since its use will prevent milk souring. Milk rejected means a cut in the farmer's milk cheque, so that the cooler can also increase the farmer's income.

During the summer months cows are continuously irritated by flies. This quite naturally affects the milk yield. Electricity can assist here. If the cows are housed during the night and electric volatilisers installed in the building a deposit of insecticide is formed on the hide and this will keep the flies away during the daytime. One farmer in Devonshire who installed such equipment claimed that during the hot weather his milk yield was increased by 30%.

Saving in Crops

The English weather can be a very fickle master. In the past when the weather was

bad at the normal harvest time, crops had to be left in the field—the hay to rot and the grain to sprout. Nowadays farmers are insuring against the loss of harvest by installing electrically driven grain or grass driers.

Convenience

All electrical appliances on the farm make life easier but from the almost endless list consider just two. Although it was shown earlier that lighting by electricity is far cheaper than by oil, no-one would deny that because of the added convenience it is an amenity well worth paying for. No lamps to fill and clean, no need to fumble for matches in the dark. With a two-way switch in the yard it is possible for the farmer to make his "final round" with ease and there is no need to stumble along when visiting the sick cow or having to attend to the difficult calving in the middle of the night.

Cleanliness in the milking operation is essential in the interests of public health, it is also necessary if the farmer is to benefit from the premiums paid for "Quality Milk." The udders have to be washed and most farmers agree that "letting down" is encouraged if in the process the udders are massaged with a warm cloth. It is necessary also to have suitable facilities for the operators to wash their hands. For hot water the thermostatically controlled heater provides all the needs with the minimum wastage of energy. If the farmer does not wish to install a piped water supply to the heater, the bucket water heater will provide modest needs at a very low cost of equipment and installation.

Two Questions

At every farm visited by the author two questions were asked: "What are the disadvantages of electricity?" and "What are the advantages of electricity?" The replies to the first question were always similar and can be summarised by one farmer's words, "Everything has increased in price these days including electricity." However, when it was pointed out to him that compared with most of the "necessities" the increase in the cost of electricity has been very small, he realised that the Electricity Board is doing a good job in helping to keep down the cost of electricity in a period of inflation. To the second question there were many and varied replies. From these the following summary has been prepared which may assist in convincing the farmer who is hesitating about taking a supply:

Electricity makes the farm-hand a more contented workman since it takes the unpleasantly hard work away from such jobs as milking, root cutting by hand, stoking solid fuel boilers and, on the poultry farm, food mixing and plucking.

The time of having a tractor out of commission can be reduced since with electricity available many agricultural engineers will carry out a rebore on the farm.

The electric motor for driving the milking machine vacuum pump saves many wasted hours on cold mornings when a petrol engine would be difficult to start, and also prevents the often frayed nerves.

If long-horn cattle are kept, good lighting helps to prevent accidents to staff. On a non-electrified farm one of the staff had been away from work for three weeks as a result of an accident in the byre. In the farmer's opinion this accident would not have happened if there had been adequate lighting.

Are these the only advantages and benefits of electricity? No, there must be many more that farmers and Electricity Board's staff can enumerate, but there is one more worth mentioning now. One farmer's wife was asked what, in her opinion, was the greatest benefit of electricity on the farm. It was anticipated that she would say "good lighting" but instead she replied "a less irritable farmer and therefore a more congenial husband." Surely this is a publicity line worth pursuing, but 'twill be a brave Area Board which will start a campaign with the slogan—"Electrify your farm and avoid the Divorce Court."

MOTOR MAINTENANCE

ADVICE on the installation and maintenance of electric motors is given in a useful booklet produced by the British Thomson-Houston Co. Ltd. Industrial type machines from 1 to 40 h.p. are dealt with, and the well set-out pages give information on all aspects of their care.

As an interesting introduction, there is a section on the manufacture of such small motors, but thereafter this booklet gets down to hard facts with chapters on installation, care and maintenance, faults and their diagnosis, possible causes and effects of unsatisfactory performance, and connection diagrams. Following this comes a useful selection of data tables of the kind that are always valuable to the factory engineer.

Copies of this valuable handbook can be had from the British Thomson-Houston Co. Ltd., Rugby, but applicants are asked to write on their firm's letter-heading.

NOTES ON WIRING by Megohm

Trying Times

SIGNS of winter approaching are upon us and low lying clouds filled with "Smog" have made their presence felt by bringing London traffic almost to a standstill on more than one occasion this month. Further, many people have been laid low with colds by this solid fuel menace and the costs to industry are surely incalculable.

Socket-outlets

Plug and socket manufacturers are now rightly drawing attention to the cleanliness and convenience of electric heating apparatus with electric outlet points and provide socket-outlets installed in new residential and commercial premises. They are also doing what they can to get the authorities concerned to specify that more socket-outlets must be installed in new installations. However, they realise there are many installations where the lack of a reasonable number of socket-outlets creates a demand by the consumer for adaptors. In consequence reputable manufacturers find it necessary to produce safe adaptors both for the round pin and flat pin sockets. It is unfortunate that adaptors have to be marketed but it is obvious that the consumer who needs an adaptor will purchase one and it is far better that he is able to purchase a well-designed and good quality adaptor than some inferior type that can be bought from chain stores and non-electrical establishments.

Conversion

I have noted with interest that one of London's biggest landlords, the Church Commissioners, have worked out a way of converting 50-year-old tenements into self-contained flats. They intend to take out the old gas lighting and install electric lighting points throughout. I also hope that they will take good advice on equipping these flats properly and the desirability of having adequate socket-outlet points as set out in the relevant Code of Practice.

The findings of the Court of Inquiry presented to Parliament by command of Her Majesty in connection with the recent wage dispute between the National Federated Electrical Association and the Electrical Trades Union published last week indicates that understanding, tolerance and appreciation of the other chap's point of view is essential in the maintenance of happy industrial working agreements. Dilatory methods give rise to suspicion and discontent. The salaried officials of organisations today have great powers and responsibilities and should see that every reasonable request for discussing conditions of employment is effected without undue delay. Far better is quick personal contact than a flow of correspondence over months between the parties.

Monopoly Employment

Monopoly control some say is fine—one can purchase in bulk, combine several operations under one head and so on and one can also limit the number of supervisory positions that would be necessary if production came from several sources. Anxiety is growing with personnel holding supervisory and administrative positions under monopoly control in so far that this brings with it regimentation of working conditions, including infiltration into their private lives. Under monopoly control the individual may lose his sense of initiative since a mistake or two in the service of private enterprise may necessitate graceful retirement and re-employment with another firm, but under monopoly control and only one employer what happens when one falls by the wayside? I hope within our industry we shall at all times have private enterprise and the freedom to seek employment with whom we choose and to employ whom we choose.

Education and training of engineers for the electrical industry has been the subject of close attention by the Institution of Electrical Engineers. It was also the subject of the presidential address given to Members of the A.S.E E. by Mr. Melling, the Chairman of the Eastern Electricity Board. In his address, electrical engineers were classified into three groups—professional engineers, technicians and craftsmen—and their training follows defined courses although in some cases it was accepted that the dividing line between each group may overlap. The whole position is somewhat complex but no doubt will be properly sorted out in due time. Emphasis was made that in any education and training schemes facilities should be provided for suitable people to progress from grade to grade.

THE ELECTRICAL REVOLUTION

I.E.E. Supply Section Chairman's Address

SOME interesting comments on electrical development were made by Dr. L. G. Brazier, when he delivered his Chairman's Address to the Supply Section of the I.E.E. last night. Dealing with electricity consumption throughout the world, he stated that there could be little doubt that the increasing population and rising standard of living in America were only supported by a phenomenal increase in electricity consumption. This, in the U.S., stood at 2,700 kWh per person per year, the highest figure in the world. In Great Britain the equivalent figure was 1,100 kWh. In factories, the position was perhaps even less favourable. With an industrial consumption of 15,000 kW per year, the American worker has about 5 times the power of his British counterpart.

To produce electricity, fuel was needed, and on the question of world material and energy resources, the recently issued report of the President's Materials Policy Commission was, as far as America was concerned, far from reassuring. It appeared that as early as 1970 the demand for oil would be such that it would be economically attractive to obtain it by synthesis from coal. This would increase the demand for coal in such a way that a tenfold increase in the 1950 U.S. mining industry would be necessary in 45 years. The situation in this country was just as alarming. The only solution was in fact the utilisation of atomic power.

Exported Electrons

A new tool now available to man was the high energy beam of electrons which could be produced from Van de Graff generators. One interesting phenomenon was that a packet of electrons of high energy could so to speak be "trapped" within a disc of boro-silicate glass. A section of glass containing these electrons had been flown to England from Cambridge, Massachusetts. By scratching or pricking the surface of the glass these electrons could be released giving a bright flash and a discharge potential of about 2,000 volts. It would be noticed that a "tree" pattern of hair cracks was produced within the glass on the plane of the "stored" electron layer.

Automatic switching by relays and electronic valves had provided a means whereby the binary system could be employed for automatic computing purposes, and calculating machines had been built using this principle. A point that had been raised was "Can these machines think?" Although everyone thought he knew the answer to this question, the more carefully the situation was examined, the more difficult it became to pin-point a specific example where the answer was clear cut. A machine could be arranged with the ability to organise new information meanfully and to select alternative modes of behaviour on the basis of this organisation. Oettinger had pointed out that his machine could be "trained" in such a way as to reproduce the classic biological experiments on conditioned reflexes.

Automatic Factory

The electronic calculator had already opened up new fields and methods of mathematical calculation, and modern theories of control and servo-mechanisms, in conjunction with such a calculator, made it possible for most human interventions in a manufacturing process to be replaced by an automatic machine. Economically it was a question of balancing the capital cost of the machine against the running cost of the man, and increasingly the automatic machine would become preferable.

This process had already begun; in America the annual statistics showed that out of the total expenditure by the American manufacturing industry the proportion now spent on electronic devices had risen to 2%. Already there was talk of the complete automatic factory. The second Industrial Revolution was imminent. This would replace the mental operations of the worker by machine intelligence.

Even the electronic valve, which made such developments possible, was in certain fields being superseded by the transistor, which would revolutionise and stimulate the use of electronics in our daily life, and in engineering and scientific work.

We stood at a moment of tremendous technological and sociological development. The only force which could sustain progress was electricity. The changes in prospect are beyond contemporary imagination, and in the fashioning of these changes electricity would be the dominant factor.

Automatic A.C. Winders

—A NEW NORTHUMBERLAND INSTALLATION

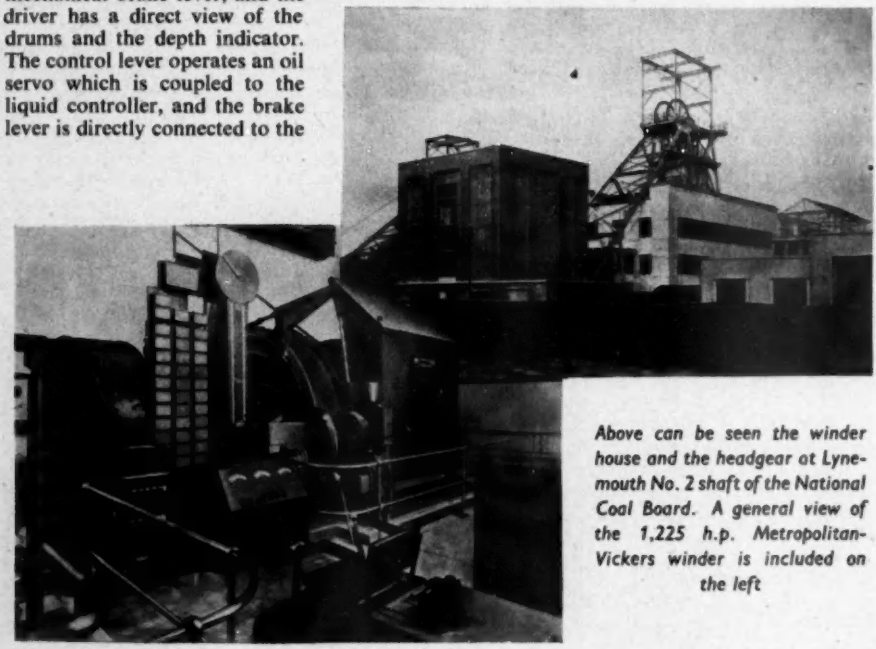
THE economic advantages of the a.c. instead of the Ward-Leonard drive for automatic winding of coal and other minerals, have been recognised for a considerable time. One of the latest of these machines is a Metropolitan-Vickers 1,225 h.p., 6·6 kV unit which was commissioned early this year at Lynemouth No. 2 shaft. In addition to automatic a.c. control, the winder can be operated manually, either from the engine house or from bank, and is also provided with dynamic braking on the "transductor-controlled system," with d.c. supply from a grid-controlled mercury arc rectifier.

Manual Control

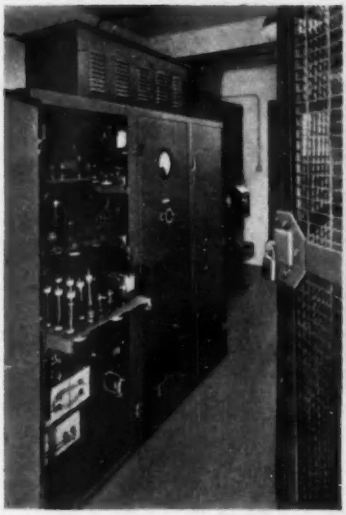
Local manual control is provided mainly for use when special maintenance work has to be carried out and is not utilised during normal winding operations. It employs an orthodox arrangement of the electrical control lever and mechanical brake lever, and the driver has a direct view of the drums and the depth indicator. The control lever operates an oil servo which is coupled to the liquid controller, and the brake lever is directly connected to the brake control valve. Single-slot lever gear is employed so that the driver is not called upon to move his electrical control lever in any direction, except forward and reverse, irrespective of whether power or braking is required.

For normal "men" and "service" winding remote manual control is used. An electrical control lever and a mechanical brake lever are installed at the bank position and these operate through remote control servos to the winder house. A miniature depth indicator, also remote controlled, is provided at bank to enable decking operations to be carried out by the operator.

In this case, the electrical control lever is coupled to the slider of a potentiometer, which is supplied with a constant d.c. voltage from a stabilised source. The voltage selected by the lever position is fed into the moving



Above can be seen the winder house and the headgear at Lynemouth No. 2 shaft of the National Coal Board. A general view of the 1,225 h.p. Metropolitan-Vickers winder is included on the left



Left is a control cubicle with the dynamic braking speed control trays. One of the trays is partially withdrawn. Above is the bank control position showing the car-tippling control and the winder-control equipment

coil element of an electro-hydraulic servo, which causes the ram of the servo to take up a position dependent on the voltage. The ram is in turn coupled mechanically to the main oil servo control valve which operates the liquid controller; hence for every movement of the remote electrical control lever, there is a corresponding position of the liquid controller, and the driver at bank can control the torque of the winder. The remote brake lever is coupled through gears to a power Selsyn which is connected electrically to a receiver Selsyn located in the winder house. As the receiver Selsyn in turn operates the control valve of the brake engine there is for every movement of the remote control lever, a corresponding movement of the mechanical brake in the winder house.

Automatic Control

The primary task of the Lynemouth winder —the raising of coal in 5-ton mine cars—is carried out automatically in response to push-button signals made by the banksman who, in addition to starting the winder, operates the car tippling arrangement.

The "closed-loop" system is used for control, in which the required speed signal (derived from a potentiometer actuated by a unidirectional cam gear) is electrically compared with the actual speed signal (derived from a tachometer-generator driven by the winder). The "error signal" resulting from the comparison is fed to the electro-hydraulic servo which actuates the controller. The torque of the winder is thus dependent on the magnitude of the speed error, and the selection of power or braking torque is determined by the polarity of the error.

Test Results

Although the winder is intended to operate automatically on raising duty only, extensive tests conducted during commissioning were carried out with various raising and lowering loads. For all these tests the winder operated automatically, including the final landing on keps.

In order to simplify the scheme, acceleration control is not fitted, and when on automatic operation the winder is allowed to accelerate freely, whether raising or lowering, under the influence of the available torque. Thus it is governed only by the peak torque permitted by the control system. This allows the winder motor to develop peak torque during all accelerating periods, and consequently reduces the time of winding when a load less than the maximum is being raised or any load is being lowered.

For raising loads, the motor runs below synchronous speed as in a normal winder, but for lowering it was considered that a more economical arrangement would be to allow the motor to run above synchronous speed. The control system is therefore so arranged that the motor operates regeneratively during the full speed period.

Whether raising or lowering, the winder is

retarded by dynamic braking and the rise in speed when transferring from regenerative to dynamic braking has been kept to under 3%.

A series of tests was also conducted at an artificial bank (without using keps), applying the full braking effort to stop the cage once minimum creep speed had been attained. It was found that the stopping accuracy was within $\pm 1\frac{1}{2}$ in. for all raising loads.

It may also be added that the National Coal Board has an order from Metropolitan-Vickers, for four more automatic a.c. winders for use in this area. These comprise a 1,225 h.p. equipment similar to the one described above, for Lynemouth No. 1 shaft (where it will replace the original M-V automatic winder which is being transferred to Ellington Colliery) and three 450 h.p. winders, two for Linton and one for Ellington colliery. All these units are under construction or erection.

Small Heat Pumps

E.R.A. EXPERIMENTAL DATA NOW AVAILABLE

RECENTLY released by the Electrical Research Association are two reports dealing with heat pumps. In contra-distinction to the large installations at the Festival Hall and Norwich, these concentrate on experiments carried out on somewhat smaller units. Both are written by Miss M. V. Griffith and Mr. H. J. Eighteen and the first "Characteristics of a Small Heat Pump Installation" (Technical Report Y/T15, price 15s.) gives some details of the results obtained with a German submarine installation. The object of the research in this case was to discover the performance energy ratio under various conditions. The plant was handed over to the E.R.A. on indefinite loan from the Admiralty in 1947 and consisted of (*a*) an evaporator in which heat is absorbed by a refrigerant (Freon-12) from circulating cold water, (*b*) an electrically driven compressor, (*c*) a condenser in which heat is absorbed from hot high pressure Freon vapour by water which in turn is used to warm a building or other structure, (*d*) a liquid receiver or reservoir for Freon-12, (*e*) a dryer, (*f*) a heat exchanger for sub-cooling the warm condensed Freon and superheating the suction vapour, and (*g*) an expansion valve for reducing the pressure of the liquid Freon from the condenser.

In the Perivale Laboratories, a static water tank of 10,000 gallons was used as the low-temperature heat source, and the heat transferred by the pump was dissipated by means of an external system cooled by water mains, in series with a unit heater system in an adjoining building. In addition a large hot water radiator in an adjoining room could be added to this arrangement if necessary. The compressors and water pumps were driven by d.c. shunt motors and the cold-water pump—driven in the submarine by the main motor shaft—was independently driven in the laboratories to give a somewhat higher flow rate than the original design which catered for flows of 14·7-17·4 galls/min.

Output

The output water temperature of the actual installation could not efficiently be raised above 130°F and thermal storage on this basis was not regarded as efficient. However, when the heat pump was arranged to feed a large radiator in an adjacent fairly well insulated office it was found to work well. A temperature of 66°F±2°F could be maintained and the system took 2 hours to attain this from cold. It was concluded that the 3 kW heat pump could operate with a performance energy ratio of at least 5 for source temperatures of 80-85°F. (Note the performance energy ratio may be roughly defined as the ratio of the BThUs available at the high temperature side to the BThUs put into the heat pump motor in the form of electricity.) This figure was obtained for an output temperature of 118°F. The lowest value of P.E.R. was 2·2 for a source temperature of 36°F and an output temperature of 113°F. The chief factor contributing to this low figure was considered to be the inadequate sizes of pipework and excessive friction losses in valves.

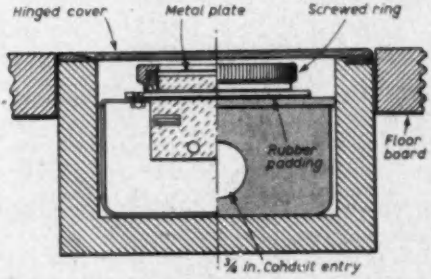
The second installation was the Shinfield Heat Pump (Report Y/T20, price 6s.) which describes a 10 h.p. installation used for heating a laboratory building. In this case the source of low grade heat was the earth and comparisons are made in the report between the energy used by the heat pump and the energy required by a gas boiler used simultaneously to heat an adjacent building of similar construction and size

PROBLEMS AND PRACTICE in Engineering

Design for Flush Watertight Switch

IN a new departmental store, the spacious wood floors in the various departments required a number of 5 amp sockets distributed throughout for display cabinets and use of vacuum cleaners, floor polishers, and so on. In the offices also, the disposition of desks using electric typewriters and comptometers required a number of similar socket outlets.

In each case these sockets were required to be located within a certain area of floor space



Here is seen the flush watertight switch, showing the internal cover and rubber seal

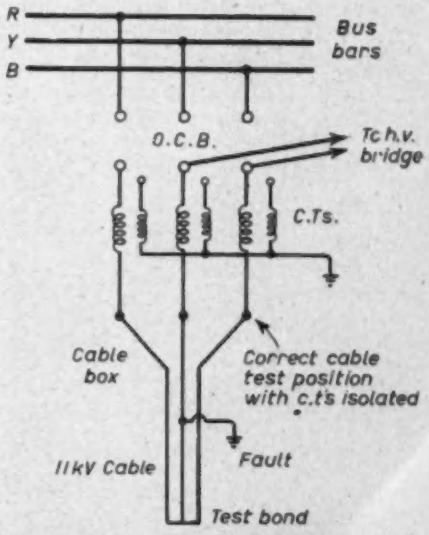
and, there being no convenient pillars or walls nearby, a flush floor socket seemed to be the solution. Since there would be periodical washing of floor boards, lino, etc., however, it was required that these sockets be waterproofed pattern, but the usual watertight sockets were considered to be too large or bulky for concealment, and accordingly a very compact unit was made up from readily available materials.

As shown in the plan, a 3½ in. square by 1½ in. deep steel box with an overlapping lid secured by metal thread screws into two tapped lugs was used as the container. A 1¾ in. hole was cut through the face of the lid and a porcelain 5 amp, 3 pin socket, with brass flange and screwed ring was inserted and secured by two brass screws and nuts. A rubber padding with sealing compound was placed between the flange face and the cover plate to ensure against ingress of moisture. The screwed ring then had a thin metal plate fitted and soldered round the inside face of the top recess to cover the pinholes of the socket, and when this cover was screwed right down the unit was totally enclosed.

Fitting the complete unit into a 4½ in. × 4½ in. × 2¾ in. teak box, a metal plate with thumb insert was hinged upon the upper edge of the box. When the unit was fitted in the floor this plate was flushed level with the floor surface, to give a robust, neat and practical socket point, the only likely weakness being the possibility that the ringed cover might be inadvertently left off.—*J.R.*

Cable Fault Location and C.T.s

AN interesting experience occurred to me when using an h.v., d.c. bridge set for locating a high resistance intermittent cable fault which at first led me to think a breakdown had occurred on a current transformer. A current of 3 to 5 milliamps was being passed by the rectifier valve set when it was noted that at every kick of the milliammeter a spark was heard coming from current transformer chamber of the o.c.b. which had been isolated for the test. The c.t.s being immersed in penetrol there were no



Shown in this diagram are the cable connections to the bridge, indicating how the c.t. primary windings were connected in series with the fault

visible signs of this sparking until the instrument panel was opened when sparks were seen jumping from the c.t. secondary wiring contacts to earth.

It was then realised that the testing circuit was including the primary windings of two current transformers and pulsating d.c, was being applied to them, due to intermittent nature of fault. As the o.c.b. was isolated the c.t. secondary plugs were open circuited, thus inducing a high voltage in secondary windings of the c.t.s. The only solution, apart from short circuiting all c.t. secondaries, was to drain the penetrol and isolate the primary of each c.t. from the cable box connections and apply the test voltage direct.

It is of course more preferable to test any cable direct, particularly where, to break down a cable fault path, a much higher voltage is required than that at which the c.t.s may be designed to work. It is, however, often much quicker to plug test leads into o.c.b. outgoing sockets and test via the c.t.s but where o.c.b. isolation also opens c.t. secondary windings this is obviously a dangerous condition, with the possibility of also impairing the accuracy of the c.t.s. This phenomenon would also have occurred had the voltage for breaking down the fault been applied to the yellow phase c.t. only except that in this case, only one c.t. would have been in circuit, instead of two, as shown in the diagram.—*H. W. R. Ogden.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

British Columbia's Expansion

THE tremendous industrial development now taking place in British Columbia is reflected in a noteworthy expansion in other directions in this province. Evidence of this is to be seen in the latest annual report of the British Columbia Power Commission which in addition to operating throughout Vancouver Island, supplies electricity to many of the interior communities in the province. For the year ended 31 March last, the Commission reports that units generated and purchased amounted to 526·8 millions, an increase of 39·1%. The average domestic consumption increased by 14·6% during that period to 173 units monthly, although in several districts the average consumption was over 200 units a month. In all 49,509 consumers receive a supply, 3,597 being added during the year.

Hydro Power

From the Commission's point of view, the growth is further emphasised by the fact that all but ½% of the power was generated by its own plants, whereas in 1946-47 the corresponding figure was 43·5%. At 31 March last, the installed capacity of the Commission's plant amounted to 123,845 kW. Of the 526·8 million units generated some 92% was provided from hydro-electric plants, chiefly on Vancouver Island, but the Commission also operates 19 diesel stations which, during the year covered by the report, generated 39·2 million units. The only steam plant, at Kamloops, is maintained as a standby. During the year the Clowham Falls hydro-electric plant was put into operation with two 1,500 kW sets. The third and final phase of the John Hart Development was also nearing completion, bringing that plant's capacity up to 120 MW.

The Commission is to acquire an existing generating plant on Puntledge River, Vancouver Island, and surveys already carried out indicate that a further 35,000 h.p. turbine and generator could be located adjacent to the present station. Surveys have also been made in connection with future developments at Whatshan Lake and Kokish River. There is also a proposal to purchase power from the Alcan system at Kitimat to meet requirements at Terrace, this method being considered cheaper than constructing a hydro scheme in that region.

On the transmission side, the Commission reports that with extremely light snow conditions during the past winter there was almost a total absence of sleet-jump on the 132 kV transmission line conductors. With the rapid expansion already noted, much of the work of the Distribution Section was devoted to increasing capacities and improving voltage conditions; more circuit-reclosers were also installed. The distribution system was increased by 183 miles of line including a submarine cable between Vancouver Island and Quadra Island.

Despite all the heavy expenditure which has been necessary, operations for the twelve months ended 31 March last resulted in the record net surplus of $393,669, which is transferred to the rates stabilisation reserve.

Supply from Penal, Trinidad

Recently Commissioned 10MW Station uses Gas/Oil fired Boilers

THE Penal power station, in the south of Trinidad has now been operating for some short time, and a brochure has been issued marking the official opening of this important unit. Although at the moment 10 MW of installed capacity is envisaged additional plant has already been ordered for extensions which will bring the capacity—within the present buildings—up to a total of 30 MW.

This station is part of a general scheme introduced by the Trinidad and Tobago Electricity Commission, to provide a cheap, abundant and reliable supply of electricity on a commercial basis.

Plant Installed

Trinidad is well provided with natural fuel, particularly in the form of oil and asphalt, and as a consequence, considerable quantities of natural gas are available. The boilers, by Babcock and Wilcox have therefore been designed to operate on either gas or oil, although the latter will only be used in cases of emergency. For the two 5 MW sets there will be two 60 klb/hr, 425 lb/sq in., 750° F, header-type boiler units with water-cooled furnaces, each fitted with four composite gas/oil burners. Although these units may appear on the small side, they include all modern refinements including a complete instrumentation system.

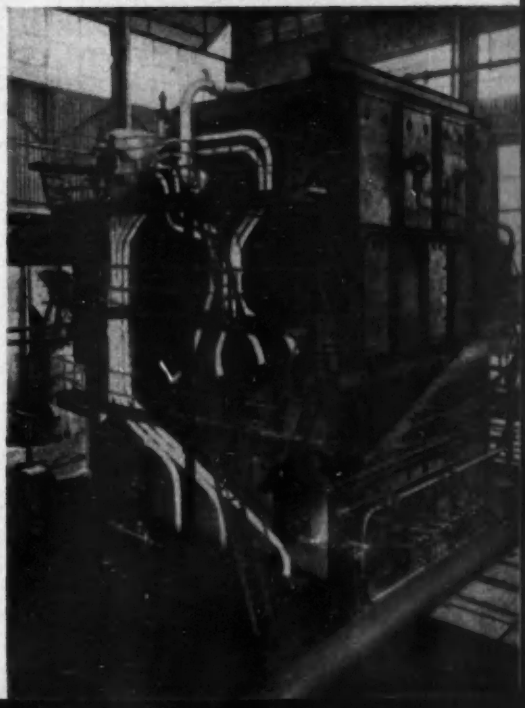
The 5 MW turbo-alternator now running is made by BTH and is a 60 c/s machine generating at 6·6 kV. The second set, now under construction will be wound for 11·5 kV. This unit is not due for erection until 1954. The third set which will be up to 20 MW capacity, supplied from a 240 klb/hr unit boiler will operate under higher steam conditions than the two 5 MW units at present in hand. One of the great difficulties was the provision of an adequate supply of cooling water. This has been overcome by the sinking of four wells located at opposite corners of the site. These wells provide sufficient make-up water to maintain a cooling tower system.

The main switchgear, by Reyrolles, operates at 11·4 kV and initially will control one 5 MW turbo-alternator, two 1,000 kW station transformers and seven outgoing feeders. Provision has been made for the second 5 MW generator. Rating of the switchgear is 350 MVA and duplicate busbars are provided. The circuit-breakers are remote-controlled from a control board mounted on the floor above the switchgear.

Each 1,000 kW station transformer feeds a 415 volt auxiliary switchboard, composed of Reyrolle 25 MVA horizontal draw-out metal-clad oil-break circuit-breakers. These panels control supplies to the alternator auxiliaries besides feeding an air-break switch-fuse distribution board with separate circuits for miscellaneous services in the station. To enable the station to be started up initially when the station transformers are not energised, there is a 500 kW diesel-alternator set, which can be connected to the 415 volt auxiliary switchboards.

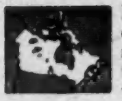
The cables are by B.I.C.C. who have supplied more than 2,000 yards of 11·4 kV and 660-volt cables for the first part of the station. B.I.C.C. have also played a great part in the Trinidad network where they have installed considerable quantities of p.v.c. covered cables for distribution, and were also responsible for the 66 kV backbone of the main transmission system.

The C.T.M. gas/oil fired boiler in the last stages of erection in the power station



overseas news

Appliance Expansion



In the next ten years, production of Canada's electrical apparatus manufacturing industry is expected to expand to 3½ times its present volume, according to Mr. A. M. Doyle, general manager of the Canadian Electric Co.'s Appliance Division. The growing demand for power, plus the necessity to produce equipment to bring reserves of power-producing equipment to a safer level than at present, means that the electrical apparatus industry will be called upon to produce as much equipment in the next decade as it has in the past sixty years, according to Mr. Doyle.

Need for St. Lawrence

Canada wants to begin work on the St. Lawrence River power project by next June, Mr. L. Pearson, the Canadian Minister for External Affairs has told Mr. Dulles, U.S. Secretary of State. The latter gave his assurance of co-operation in completing the necessary legal preliminaries as quickly as possible.

Another Line

A main transmission line is to be constructed from the 300,000 h.p. project on the Bersimis River to Quebec City, a distance of about 200 miles, it has been announced. This line is to be constructed at the same time as a similar line between the Chibongamau gold mining area and the Bersimis plant is erected. This new project of the Quebec Hydro Electric Commission is planned for operation by 1956.

Atomic Station

A full-scale power reactor to produce at least 60 MW is to be built by the U.S. Atomic Energy Commission, Mr. T. Murray, a member of the Commission revealed last week. It is hoped to have the plant in operation in three or four years. He admitted that there were still many scientists who considered that development should have been continued until they could be sure that the power produced would compete with conventional power. But it was decided to construct the unit because they had much to learn that could only be learned by building and operating, he added.

Change of Plan

The "Villaveces" plan for the installation of small power plants throughout Colombia, has been abandoned by the new Government, we understand. Instead of the twenty or more 2,000 kW generating plants earlier proposed, the Minister of Development has announced a plan to build several large power stations which would be linked by grid systems in order to provide power for the smaller municipalities. Under this alternative plan, Colombia's generating capacity will be raised from its present 337 MW to 500 MW.

Another Greek Contract

The French electrical construction concern, "Alsthom," has been awarded a contract for the supply of equipment for the new distribution system being planned for installation throughout Greece. This is part of the major plan for the construction of hydro-electric and steam power stations, along with an extensive 150 kV grid transmission system, to which we have earlier referred. This latest contract, valued at about 5,000 million francs, is for the first section of the distribution work, we gather, for which the consulting engineers were also a French concern. Its award is not unexpected in view of the recent extensive loan made to Greece by France.

Expansion in Iceland

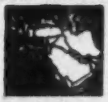
Iceland's largest power station, on the Irafoss, was formally opened by President Asgeirsson a few days ago. This is the second stage of the Sog River development. This new station has two Westinghouse 21,000 h.p. turbine generators, provision being made for the installation of a third at a later date. Built at the Iru Falls, some 32 miles from Reykjavik, the station is intended principally to serve that city. Another power station, constructed on the rugged north-east coast near Bruar Falls, was also put into operation this month. This station, where a 11,500 h.p. machine is installed, is to serve Akureyri, the textile centre.

Boiler for Cape Town

A tenth boiler is to be installed at Cape Town City Council's Table Bay power station and negotiations are to be entered into with the manufacturers of the existing boilers, Babcock and Wilcox, Ltd., for its supply and installation, which, with ancillary equipment, is estimated to cost £400,000. When extensions to the station were under consideration in 1947-48 it was agreed not to proceed with the installation of the tenth boiler, as originally proposed, as it was considered that a load of 160 MW could be supplied from seven steaming boilers and that all nine could be overhauled annually. Since then, however, owing to a reduction in the calorific value, and particularly in the grading, of the coal now obtainable —which is likely to become worse—eight boilers are needed for heavy load periods leaving only one boiler to be out of commission. The installation of the tenth boiler is expected to result

in an improvement of boiler house efficiency to the extent that the coal bill will be reduced by at least £38,000 a year against which the capital charges on the new boiler will amount to £33,000 a year. The new boiler is hoped to be in service by the winter of 1957.

Another Jordan Scheme



The latest plan to utilise the River Jordan, to provide irrigation and power, for Jordan, Syria, Israel and the Lebanon, has now been prepared by the Tennessee Valley Authority, and handed to the United Nations Relief and Workers Agency for Palestine Refugees. Primarily intended to permit the resettlement of about 200,000 Palestine Arab refugees, the scheme is estimated to cost $121 millions, plus $14 millions for a power dam on the Yarmuk River. The report also adds that the diversion of the water from the Mediterranean to the Dead Sea to generate electricity—which was part of the plan prepared by Mr. Hays and Dr. Lowdermilk—would cost $76 million. Judging from reports, it seems that this new plan has some merit in that the first stage—to use the Yarmuk waters for irrigation—could be carried out quickly, but difficulty arises in securing agreement between Israel and the three Arab states—particularly in view of recent developments in the area. To pave the way for implementation of the scheme the Jordan cabinet has already decided to cancel the concession previously granted to the Palestine Electric Corporation Ltd., to use the Yarmuk River for its Naharayion power station. This station was occupied by Iraqui forces in 1948 and was later handed over to the Arab Legion.

Transformer Production

In collaboration with Partridge Transformers Ltd., in England, a new company has been formed in Travancore-Cochin state, with the title of Indian Transformers Ltd., who are to manufacture a range of transformers in India. Its authorised capital is Rs. 25,00,000 of which Rs. 10,00,000 have been issued. It is stated that the English concern has agreed to furnish the necessary technical assistance. Negotiations are in progress with the Travancore-Cochin Government for actual financial participation in the company.

Tasmania's Profit

The Hydro Electric Commission of Tasmania made a gross profit of £1,317,060 in the past financial year, an increase of £471,417 on the previous year. This is disclosed in the annual report of the Auditor-General recently tabled in the State's House of Assembly. The net profit amounted to £144,679 compared with a net loss for the previous year of £88,505. Revenue for the year increased by £569,167 to a total of £2,443,082. Revenue from domestic consumers showed a rise of nearly 40% on that of the previous period. It is estimated that 26% of the rise was due to higher tariffs and 14% from the 5,000 new consumers.

Inter-Island Power

The suggestion for the transfer of electric power from New Zealand's South Island across Cook Strait to the North Island (to which we referred on October 15) has aroused a good deal of opposition, it seems. At the recent conference of the South Island Local Bodies' Association it was agreed that before any proposal to transfer power was proceeded with there should be an investigation of the capital expenditure involved and the resultant line loss in transmission. At the conference, Mr. M. Connolly of Dunedin, said that in the South Island there was land and power available; it was more economic and satisfactory for the distribution of population, and in the national interest to take industry to where the natural resources were. In a letter read at the conference, the Minister in charge of the State Hydro-Electric Department, Mr. Goosman, said that although information was being collected on submarine power cables overseas and a preliminary survey of parts of Cook Strait had been carried out, these activities did not mean that it had been decided to install a cable. The data would enable departmental engineers to consider the technical aspects of the proposal.

Hydro Surveys

With a view to providing New Zealand with more hydro-electric power in the future, reconnaissance surveys have been carried out to determine the optimum use of the power potential of the Upper Rangitaiki River, the Rotorua Lakes and the Kaituna River area. Reporting this, Mr. C. W. O. Turner, engineer-in-chief, states that a similar plan for future investigation was under preparation for the Southland Lakes, including Te Anau, Manapouri, Monowai, Hauroko and Poteriteri. A reconnaissance of possible power projects was also made during the year in North Canterbury, Marlborough and Buller. An investigation was also made into the potential of the Waikato River below Karapiro with a view to possible development of the remainder of the fall of the river to the sea.

Loans for Japan

Coincident with the news that the International Bank for Reconstruction and Development has agreed to make three loans totaling $40·2 millions to help finance the construction of three thermal power stations in Japan, an announcement has been made by the Westinghouse Electric International Co. that it has received orders to supply much of the plant. The recipients of the loans are the Kansai Electric Power Co. Inc. (which will get $21·5 million), the Kyushu Electric Power Co. Inc. (to get $11·2 million) and the Chuba Electric Power Co. (which will receive $7·5 millions). The Westinghouse orders are for two 75 MW power plants for the Kansai Co., to be installed at Tanagawa station, near Osaka, and one 75 MW unit for the Kyushu Company, to be erected at Karita.

D

PERSONALITIES

IN THE INDUSTRY

Director and joint general manager of Bruce Peebles and Co., Ltd., **Mr. W. B. Laing,** M.I.E.E., has been appointed general manager of that company, with responsibility to the managing director. He has been with that firm since starting as a pupil apprentice in 1920. A Scot, Mr. Laing was educated at Hawick High School and Heriot-Watt College, Edinburgh. After completing his works training with the company, he went into the Rotating Plant Sales Department, and subsequently became its chief. In 1943 he was appointed manager of the Rotating Plant Department, joint general manager in 1952, and a director of the company later that year. In the transition period since the war he has been primarily concerned with projecting the firm's range of rotating electrical plant, as the result of which the company became closely associated with hydro-electric development, in which sphere large contracts have been undertaken for big generators for home and abroad. Mr. Laing is a vice-chairman of the S.E. Scotland sub-centre of the I.E.E.

Mr. W. B. Laing

Sir Robert Renwick, Bt., K.B.E., has joined the board of Reliance-Clifton Cables and Industrial Products and has been elected chairman, a post which, since the death of Mr. Arthur Collins, has been temporarily filled by **Mr. Henry Davis,** managing director of the operating company, Reliance Electrical Wire Co.

The directors of Elliott Brothers (London) Limited, announce that **Mr. H. C. Pritchard,** B.A., F.R.Ae.S. has been appointed deputy general manager in charge of science. A distinguished scientist, Mr. Pritchard was until recently chief superintendent of the Long Range Weapons Establishment in Australia. Prior to that, head of the Instrument and Air Photography Department of the Royal Aircraft Establishment, and has been intimately associated with guided missiles and aircraft instrumental equipment for some years. He was awarded the first Gold Medal of the Institute of Navigation for his contribution to the science of air navigation.

Mr. E. Austyn Reynolds has resigned from the board of Tube Investments Ltd. as from October 31, because of indifferent health. He will continue to carry out his other responsibilities in the TI aluminium division.

Mr. G. E. Richards, A.M.I.Mech.E., A.M.I.A.E., has been appointed assistant manager of the Prestcold Refrigeration Division of Pressed Steel Co., Ltd. He has been for some years previously sales promotion and publicity manager of the Refrigeration Division and prior to that was associated with other activities of Pressed Steel Co. In addition to his new managerial duties Mr. Richards will continue to control the operation of the Sales Promotion and Publicity Department.

Mr. G. E. Richards

Mr. J. Turner, secretary of Bullers, Ltd., has been elected a director of the company. Two other executives have also been elected to the Board—**Mr. G. Perrins,** the chief engineer, and **Mr. W. Bourne,** the works manager.

The B.B.C. have made two changes in their engineering division. **Mr. H. Walker,** O.B.E., A.M.I.E.E., becomes assistant superintendent engineer, television studios, and **Mr. W. D. Richardson** becomes assistant superintendent engineer, television outside broadcasts.

Sir Cecil H. J. Harcourt has been appointed a director of Dewrance and Co., Ltd.

Export sales manager of Evershed and Vignoles, **Mr. H. W. Griffiths,** A.M.I.E.E., M.S.M.A., is leaving London by air, on Saturday next, for business visits to Pakistan, India, Ceylon and Burma.

Mr. S. J. Hewlett, A.M.I.E.E., has joined the meter design staff of Smith Meters, Ltd., as assistant to Mr. H. E. Angold. Mr. Hewlett was previously with Measurement, Ltd., in charge of the meter and instrument development, and specialised in that company's ripple control equipment. Smith Meters, Ltd., also announce that **Mr. W. W. Scott,** previously chief accountant, has been appointed secretary to the company.

Mr. T. H. Greaves, manager of the Nottingham branch of the General Electric Co., Ltd., has been elected president of the Nottingham Society of Engineers.

Sir Reginald R. Whitty has been appointed chairman of the Rothermel Corporation Ltd. He is also a director of the British Thermostat Co., Ltd. In addition, **Mr. B. W. Milliken,** managing director of N.S.F. Ltd., has been appointed a director of Rothermel Corporation.

Chairman of Simon-Carves, Ltd., **Mr. R. B. Potter,** has joined the board of Davy and United Engineering Co. Mr. Potter is on the boards of many other companies in the Simon group. Both he and Mr. O. F. Cambell, chairman of Davy and United Engineering Co. are on the board of the Metallurgical Equipment Export Co.

Mr. P. A. Negretti has been appointed chairman of Negretti and Zambra Ltd., and **Mr. P. N. Negretti** has been appointed managing director. They succeed in these posts Mr. P. E. Negretti, who died recently.

Ekco-Ensign Electric Ltd. have appointed two more representatives, **Mr. F. H. Damerell** to cover the counties of Devon, Cornwall, and also West Somerset, and **Mr. D. G. Bateman** for the greater part of the county of Hampshire, including the Isle of Wight.

Mr. E. N. Robinson, LL.B., deputy chairman of A. Reyrolle and Co., Ltd., a director of a number of other companies and senior partner in the firm of Watson, Burton, Booth and Robinson, solicitors, has been appointed to the board of C. A. Parsons and Co., Ltd.

Concerning the appointment of **Mr. W. L. Brown** as chief engineer to Transformers (Watford) Ltd., which we noted last week, we are asked to make it clear that he relinquished in 1944 the position of chief assistant designer to Mr. E. T. Norris of Ferranti Ltd., which he held for 20 years, to become sales engineer, subsequently returning to work under Mr. Norris to devote his attention to medium power transformers. One other point—his war service related to the 1914-18 war, of course.

OBITUARY

We recorded but briefly last week the death, at the age of 90, of **Mr. W. R. Rawlings,** A.M.I.E.E., who to many will be remembered as the first president of the Electrical Contractors Association, in which organisation he played such a prominent part for many years. A remarkable character in many respects, Mr. W. R. Rawlings and his elder brother, John J. Rawlings, founded the firm of Rawlings Bros., of which he ultimately became chairman. He was also one of the founders of the Sun Electrical Co., Ltd., and a director of the Rawlplug Co. But it was in connection with the contracting industry that he was more widely known. He had, in fact, the unique experience of being president of the E.C.A. on three occasions, the last in 1931-32.

Mr. W. R. Rawlings

Mr. E. S. Whaley, formerly showroom manager to the Kingston Corporation Electricity Department, died on October 19, aged 69.

By the death on October 24, at the age of 79, of **Lt.-Col. W. A. Vignoles,** D.S.O., M.I.E.E., the electrical industry loses another of those colourful personalities who have played a large part in the development of the industry. Col. Vignoles started as a pupil with W. T. Goolden and Co. and gained further experience under the late Mr. Ll. B. Atkinson. Later he took charge of the firm's coal cutting plant in pits in Durham, before joining Crompton and Co., where he became chief draughtsman. From 1899 to 1901 he was with Sir Alexander B. W. Kennedy, drafting specifications and preparing plans for power stations, and became resident engineer during the construction of the Grimsby Corporation electricity works. The natural sequel was his appointment as borough electrical engineer there, a position he held till the end of 1927 apart from war service. During this period he was president of the I.M.E.A. in 1922-23. His outstanding qualities were further evident during his period as director of the Electrical Development Association from January 1928 to December 1930, during which time the organisation of the Association was considerably developed. But in January 1931 Col. Vignoles took up the position of joint managing director of Evershed and Vignoles. He thus returned to the firm which was established by Mr. E. B. Vignoles, Col. Vignoles' brother, and Mr. Sydney Evershed, in purchasing the instrument business of W. T. Goolden and Co., where Col. Vignoles had been a pupil. He was joint managing director until ill-health forced him to retire from that position in 1941, but he continued as a director. He also served for many years on the councils of I.E.E. and B.E.A.M.A.

Lt.-Col. W. A. Vignoles

Mr. E. F. Behenna, district commercial engineer, Sevenoaks and Horley, of the South Eastern Electricity Board, died on October 23, aged 57. He gained early experience with the Marylebone Corporation undertaking and in 1930 joined the County of London Electric Supply Co. Before joining the South Eastern Board he was development officer for the Croydon Rural District of the County Co.

Prof. Maurice Lugeon, F.R.S., a well-known European authority on the construction of hydro-electric projects, on which he had written many books, died last week. He contributed to the preparation for large dams for the Genissiat and Donzere Mondragon power plants in France.

Mr. Alexander Fraser, M.I.E.E., who died on October 21, was, until retiring in 1926, a partner in the Glasgow electrical engineering firm of Fraser and Borthwick, Ltd.

NEW LITERATURE

Electrical Undertakings of the World

IN this 1953-54 edition, the style and arrangement of the information follows that of previous years. The major portion is again devoted to the B.E.A., and the Area Boards, including data of plant installed at the generating stations, all the information having been revised. This is followed by details of British Commonwealth and foreign undertakings, in which sections additional particulars have been included in this edition. With the present emphasis on export business, this expansion will be appreciated by many who have found previous editions of considerable assistance. Published by Benn Bros. 594 pages, 5¼ in. × 8½ in., price 30s.

Farm Lighting

THIRD in E.D.A.'s farm electrification series, this admirable handbook makes a valuable contribution to the study of farm lighting. The theme is developed bearing in mind both farmers' and supply authorities' approach to the subject.

Farmers' electrical advisers, agricultural college students and contractors will also find much of value in this book, with its emphasis throughout on the efficiency (direct and indirect) of the planned installation. From an introduction discussing lighting terminology, suitability and farmstead requirements, it progresses to an extensive appraisal of lamps. Not only are tungsten and filament lamps discussed in detail, but an instructive comparison of their costs is made including a tabular analysis of running costs—a useful feature. Further chapters consider exterior and interior fittings, and consideration affecting the planning of lighting installations. Its remainder is devoted largely to specific special applications, such as flash lighting for increased egg production. Design and calculations are given for certain types of building, together with notes on switch control, and the book closes with an appendix of diagrams of typical installations. Published by the Electrical Development Association, 2 Savoy Hill, W.C.2. 80 pages. 7 in. by 4 in. Price 2s. 6d.

BOOKS RECEIVED

Fundamentals of Electronic Motion by W. W. Harman. Intended for students, utilizing electron-tube analysis as a teaching medium. Published by McGraw-Hill, 319 pages, 9 in. by 5¼ in. Price 46s. 6d.

The Current Rating of Single Core Paper Insulated Power Cables, by C. C. Barnes. Outlines methods used for computing current ratings and makes reference to limiting conditions governing permissible rating and installation. Published by the Association of Engineering and Shipbuilding Draughtsmen, Onslow Hall, Little Green, Richmond, Surrey, 99 pages, 8¼ in. by 5¼ in. Price 6s. (to members, 3s.).

The M.K.S. System of Units, by T. McGreavy. Provides guidance for engineers, students and teachers, and methods of teaching. Published by Pitman, 283 pages. 7¼ in. by 4¼ in. Price 21s.

Responsibilities of the Engineer

CHAIRMEN of the specialised sections of the Institution of Electrical Engineers commonly base their inaugural addresses on some aspect of technology which they practice. Not so Mr. B. L. Metcalf, who last week spoke at the first meeting of the Utilisation Section, of which he is chairman. He took for his subject the far wider question of the engineer's responsibility to mankind in general in this present technological age. The engineer, he suggested, must realise that by improving the implements and tools at man's disposal he is altering his whole way of life. The administration of things is inseparable from the government of persons.

Mr. Metcalf took as his principal talking point the contrast between the raw materials to be found in America and Britain on the one hand, and Africa on the other, and the use made of them by the two groups of areas. Manganese may be taken from the many examples he quoted. There are no deposits of this mineral in the United Kingdom, while in 1950 the United States produced only 6·5% of its consumption for the year. On the other hand, Africa as a whole produced 1,980,203 tons, but consumed only 43,546 tons itself.

This example and similar analysis for other minerals show how the under-developed countries play an increasingly important rôle in providing the world's mineral requirements, and there are a number of problems which arise from this. Industrialisation is not merely the problem of introducing new methods of production and the tools necessary for that production. It demands a complete change of social beliefs and practices.

Education has an important bearing on the problem, of course, and an interesting development has been the setting up of colleges at university level, most of which are interested in technical education. The Institution is watching the development of these colleges to ensure that the requirements of the professional engineer are catered for.

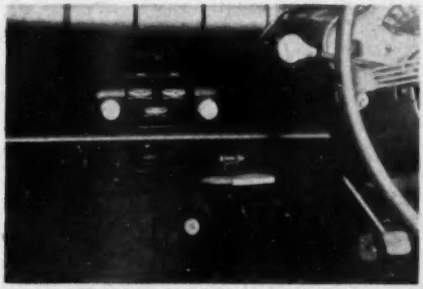
The Motor Show

Better Lighting, T.V. Suppressor Plugs and Instant engine starters prominent at 38th S.M.M.T. Show

NOW in its thirty-eighth year the Motor Show has become one of the major annual attractions in the sphere of trade exhibitions. It is perhaps ironic that its session at Earls Court, London, should coincide with a strike-bound petrol-less London just when new models bringing motoring within reach of even more of us are making their début.

As is now normal at the Earls Court Exhibition the ground floor of the huge hall is devoted to the stands of the car manufacturers, the body building firms, caravans and marine exhibits, whilst the first floor which overlooks the ground floor is devoted to tyres, accessories and components and transport and servicing equipment.

New equipment in accessories and components includes a "save-a-life" multi-purpose lamp exhibited by Belling and Lee, Ltd. This gives a white flood light for repair work and a flashing red light in the other direction. It operates from the car battery via a dashboard plug and 21 ft of cable. Sparking plugs this year include many displays of plugs with built-in T.V. suppressors. Champion, K.L.G. and Lodge feature these. Batteries include Chloride Batteries remarkable "Silver Exide" battery, a standard type introduced earlier this year which embodies "Porvic" separators and new type plate grids of a new lead alloy CB95, the whole being housed in a hard



Ekco's CR152/F radio is designed specially for Ford Zephyr and Consul cars

Crypton's new "Portostart" gives over 200 amps for starting yet weighs only 45 lb

rubber box. Porvic is again incorporated in the Dagenite batteries displayed by Peto and Radford. In this company's dual life batteries a Porvic envelope encloses each negative plate. "Crompton" batteries shown by the Young Accumulator Co. have a new design of grid made from "Nilcrode" alloy and incorporate "Dri-Stor" micro-porous separators. They have larger connector bars with increased sectional area to give higher starting voltage. Oldham and Son feature their new "Red Seal" batteries which have Fibrak separators and "X metal" grids.

Car heaters of interest are the Mark 3 model of Tudor Accessories which is claimed as the most economical and cheapest and Delco Remy Hyatts new de luxe unit.

Sparto flashing indicators with steering column switch by London Bankside Products and the latest SF 80 trafficators by Lucas, with that company's miniature auxiliary lamps and Notek Electric's "Nearlight" fog and driving lamps, and "Farlight" auxiliary lamps make their début appropriately enough with Road Safety Week.

An unusual and useful introduction is the transparent distributor cap by Remax. It is an obvious help to observe the action of the contacts and the rotor electrodes whilst the engine is running. Resistant to condensation, the cap is to be available for all makes of car.

It is debatable today whether car radio receivers are accessories or components. The latest Ekco model CR152/F specially designed for Consul and Zephyr Six cars is to all intents an integral part of the dash, fitting snugly in the glove tray alongside the steering column assembly. It is a six valve model with drum tuning which enables the user to pre-set another station almost simul-

taneously. S. Smiths and Sons (Radiomobile) have a new 4260 model, Pye a display of radio for export only and radio telephone sets for car-hire and taxi work, whilst World Radio have a new Motorola "Golden Voice."

In the transport service equipment section outstanding exhibits include Crypton Equipments new Portastart engine starter, and the new Crypton C14 test bench. G.S.L. Product's "Startall major", a portable mains operated starting equipment recently featured in these pages, Partridge Wilson's new Davenset combined engine starter and battery charger for 12 volt and 24 volt petrol and diesel engines, and F. C. Heayberd's mobile battery charger which can be easily moved about the garage. Compressor units of new design include ranges by Bristol Pneumatic Tools, H.E.C. Compressors and Engines and the "Hydrovane" by Burtonwood Engineering Co. New tools include ranges by Desoutter Brothers with five new pneumatic tools and Wolf Tools and a new "Nibblex" jigsaw for attachment to electric drills by Sterco, Ltd. A car valet equipment for garage use in vacuum cleaning the interiors is shown by Service Electric Co.

It is interesting to see the displays of firms who, well known to our readers in the electrical industry, are also prominent in the automobile industry. Much of their work is more often unseen or unnoticed.

Birmingham Aluminium Castings (1903), Ltd., feature castings in alloy for crankcases, gearboxes, cylinder heads, inductor pipes and other components. Cooper and Co. (Birmingham) well known for quality felts exhibit washers for oil retention and dust exclusion, felt channel for window fillings and pads, gaskets, shapes for engine and bodywork. Many of the models displayed are examples of the specialised finishes for the motor industry provided by Pinchin Johnson and Co. and I.C.I. (Paints Division), Ross Courtney, famous in the electrical industry for repetition parts, are featuring a new streamlined Petromag safety lock amongst displays of clips, lugs, washers, screws and other parts, whilst Runbaken Electrical Products feature ignition components, charging equipment, boosters and other auto-electrical accessories.

Geo. Salter and Co. who provide springs of all types in a variety of material, also feature the Salter Laminated torsion bar and a selection of roller bearings. Another firm in that industry, the Tempered Spring Co., show coil springs and presswork.

Streamline Filters products of course have great use in the motor industry in reconditioning lubricating oils, one of their units provides a working demonstration, and Serck Radiators have many examples of radiator equipments, grilles, tanks, etc., and brass and copper fuel and brake system tubing.

Cables in Coal Mines

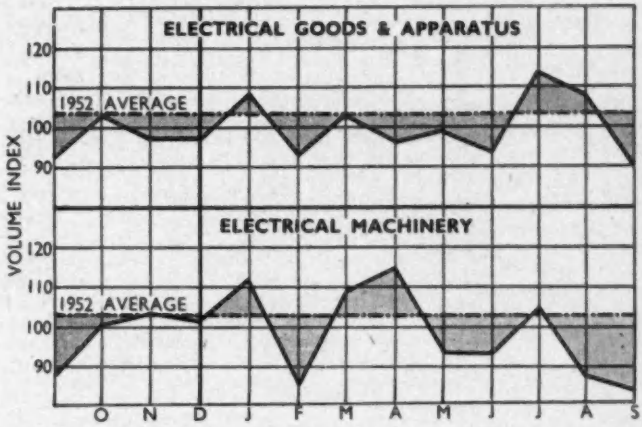
DRAFT regulations dealing with the use of certain types of cable in coal mines, which were circulated for comment last July, came into operation yesterday, under the provisions of Statutory Instruments 1953, Nos. 1509 and 1510. The second of the five orders revokes S.R. and O. 1940/293, which was introduced originally for the purpose of wartime standardisation of cables.

As stated in our issue of 23 July, 1953, the new regulations provide, in general, that earthing conductors in flexible cables for voltages above 125 need not have a cross section greater than 0·01 sq in. They also provide for the use of Type 21 cables to B.S. 708 (which have a galvanised steel strand armouring usable as an earthing conductor).

In an explanatory letter (M.F.P. Safety Circular No. 206) it is stated that, by agreement with the owners of mines subject to the act, it has been agreed that certain restrictions shall be placed on the use of cables under the Regulations. Cables having a cross-sectional area of 0·01 sq in. may be used with a portable drilling machine, but they should be either Type 30 of Part 3 of B.S. 708:1940 or Type 30, 34 or 35 in Part 3 of B.S. 708 : 1950. Moreover, they should be used only in certain circumstances. These are briefly as follows : the drilling machine must be supplied three phase, neutral earthed, and line voltage less than 125 V. There must be remote control incorporating pilot core and earth core of the flexible cable; and the remote control circuit voltage must not exceed 30 V. Any interruption of this latter circuit must cause disconnection of the cable.

Where the armouring of Type 21 cables is used as an earth conductor, the cable should carry a three phase earthed-neutral supply at a voltage not exceeding 650. The portable apparatus fed by the cable must be interlocked electrically with an automatic switch, on an interlock circuit that includes pilot core and armouring of the cable; and the interlock circuit must operate at 30 V or less.

EXPORTS AND IMPORTS



EXPORTS VOLUME INDEX

Exports in both groups fell during September as indicated by the *Electrical Times* volume index which, for both, attained its lowest value for the last 12 months. That for Electrical Goods and Apparatus dropped to 90, from a value of 108 in August, based on 1950 as 100. For September last year the index was 92. In value, exports in this group amounted to £7,449,318.

The index for exports of electrical machinery fell by 3·5 points to 83·5, as against 88·5 for September of last year, 1950 being the base year of 100. £4,073,866 was the value of goods exported in this group.

THERE was a further decline in the value of all electrical goods exported during September. Compared with the figures for August, last month's total was £208,141 down despite a small increase in exports of consumer goods. Exports of the smaller electric washing machines totalled £318,661 for September—more than double that of August. This may be due to the improved position for importing into Australia. Larger models totalling £113,160 were also exported.

There was a welcome increase also in the value of electric motors and of vacuum cleaners and other portable mechanical appliances. But complete vacuum cleaners exported last month amounted to only £133,378 in value compared with £378,952 in the same month in 1951.

Description	EXPORTS VALUE MONTH OF SEPTEMBER			IMPORTS VALUE MONTH OF SEPTEMBER		
	1951 £	1952 £	1953 £	1951 £	1952 £	1953 £
Telegraph and Telephone Wires and Cables—						
Submarine	—	33,045	182,611	—	—	—
Other	336,842	769,203	331,154	—	—	—
Rubber Insulated	556,557	466,912	284,913	—	—	—
Insulated, other than Rubber	885,075	1,300,784	881,927	—	—	—
Wireless Apparatus, including Valves	1,853,471	2,020,509	2,207,297	284,731	304,964	425,252
Telephone and Telegraph Apparatus	1,324,295	1,134,538	1,299,850	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts;—						
Filament Lamp Bulbs	151,969	74,093	98,060	11,392	8,224	17,918
Other Descriptions	397,652	391,446	354,309	57,346	53,325	45,073
Batteries (primary)	241,240	183,343	163,858	—	—	—
Accumulators, Portable	464,469	178,151	200,581	—	—	—
" Stationary	70,421	33,570	18,278	—	—	—
" Parts and Accessories	93,639	48,083	43,783	—	—	—
Electrical Cooking and Heating Appliances	449,523	267,337	269,250	—	—	—
Ammeters, Voltmeters, etc., and Parts	98,558	104,056	119,908			
House Service Meters	134,843	90,624	75,934	43,558	54,802	52,650
All Other Instruments	115,805	143,889	118,674			
Electro-Medical Apparatus	46,693	39,178	28,441	—	—	—
X-Ray Apparatus, etc.	121,968	121,982	127,449	20,419	47,735	43,926
Insulating Materials	202,180	116,404	105,662	—	—	—
All Other Articles	520,131	748,108	537,379	168,655	209,422	114,417
TOTAL OF GROUP	8,064,531	8,263,255	7,449,318	586,101	678,472	699,236
Electrical Machinery;—						
Generating Sets, Diesel (not exceeding 200 kW)	334,182	322,092	238,263			
" " " (exceeding 200 kW)	81,849	136,835	169,135	14,538	37,593	25,394
Other Generating Sets	423,790	71,127	221,758			
Generators minus Prime Movers and Parts	429,992	868,990	447,978			
Motors	779,106	738,470	749,753	35,595	53,553	42,564
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	2,188,004	2,523,601	2,295,152	34,657	18,334	54,130
Fans, Electrically and Power Driven	159,080	182,052	210,009	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	696,902	230,944	338,470	—	—	—
TOTAL APPLIANCES AND MACHINERY	13,157,436	13,337,366	12,119,836	670,891	787,952	821,324

The BUYER'S *Column*

New Specialised Aircraft Cables

TWO new specialised types of aircraft wiring cables are being introduced by BRITISH INSULATED CALLENDER'S CABLES LTD., Prestcot, Lancs. One of the new types, known as Nypren, has been designed for use in place of the well-known Pren, when there is a possibility of contamination by synthetic lubricating oil which is finding use in jet engines.

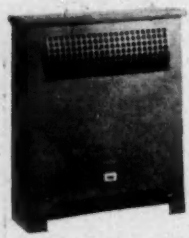
The construction of Nypren is basically the addition of a nylon covering to Pren, to afford a useful degree of protection against the synthetic oil. The diameter of any Nypren cable has been made the same as the equivalent Pren cable.

At present these cables are only available in the smaller sizes, which are type approved to MoS Specification EL 1771 Issue I.

The other new BICC aircraft cable, known as Unifire, is designed for fire detection and extinguishing circuits and will operate in open flame at 1,000°C for not less than five minutes. The composite glass and asbestos insulation is impregnated with various silicone compounds. This cable is type approved to MoS Specification EL 1736.

Arora's Convector Air Heater

ROBUSTLY constructed in sheet steel with lagged walls, the new 1 kW portable convector heater intended for domestic use by the makers, ARORA CO., of Roseberry Street, Loughborough, Leics., is available in a standard stove enamel finish of stove enamel bronze or silver green.



Model 442 is Arora's domestic model in two finishes as desired

This model 442 is supplied fitted with an indicator light to show when heater is switched "on" and is priced £10 16s. 6d. (£6 10s. plus tax). Its weight is 20 lbs and dimensions are 22 in. × 18 in. × 6 in.

Two and three kilowatt heaters of similar design are available but are arranged for floor fixing and provided with a switch to halve consumption as required. These are available in standard finish of bronze stove enamel.

The "Heraus" Furnace

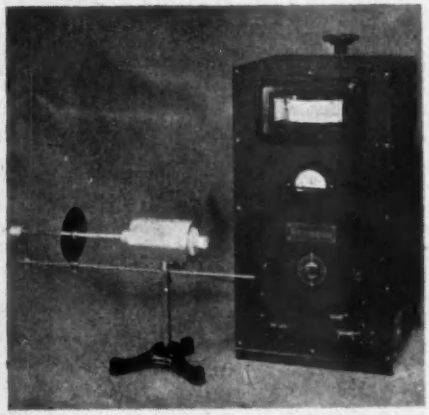
HANDLED in this country by MR. S. H. PARSONAGE, A.M.I.E.E., 17 Chalkhill Road, Wembley Park, Middx., is a small laboratory electric resistance muffle furnace of German origin, which will operate at temperatures up to 1,800° C in air. No water cooling is required nor are special atmospheres or vacuum protection required for the heating elements. Pure rhodium is used for the heating element with connectors to this being made from platinum.

The diameter of the muffle on the inside is 25 mm, the hot iron length is 250 mm of the overall length of 300 mm. The external dimensions of the tube furnace are 140 mm diameter and 278 mm long. Loading is 1 kW. A small 600 W version is available and suitable transformers and controlling auxiliary equipment.

D.F.M.'s Latest—The T.M.3

THE latest development in single phase meters of DENIS FERRANTI METERS LTD., Bangor, North Wales, is the Model T.M.3, a maximum current rating type, temperature compensated and available in 10 A, 40 A and 80 A ratings. A feature of its operation is the braking system which uses magnets fabricated from the anisotropic alloy, Alcomax II. Four magnets are used, two above and two below the meter, aimed at ensuring that distribution of braking flux is symmetrical about vertical and horizontal axis. It has the added advantages that variations in registration due to the rotor lifting or dropping are minimised.

Completely self-contained, the meter element comprises a die-cast frame bolted to a steel plate to which are fixed the voltage and current elements, the plate providing the magnetic path between the two magnets. On the die-cast frame is mounted the duraluminium rotor spindle, the rotor itself being of aluminium. Also attached to the frame is the braking magnet system, the position of which relative to the rotor is adjusted in steps of 0·4% by a micrometer screw. The register, either cyclometer or dial type, is bolted to the upper part of the frame. Cases are in either polished moulded black plastic or pressed steel.



This Heraus furnace employs rhodium heating elements

G.E.C. Germanium Diodes

THE range of germanium diodes which are of the point-contact glass capsule type marketed by the GENERAL ELECTRIC CO. LTD., Magnet House, Kingsway, W.C.2, was recently revised and extended.

GEX00 has been discontinued and GEX44/1 replaced by GEX34 whilst the GEX64 low resistance mixer is now supplied in groups matched for 5 μA forward current in the voltage range 0·2 to 0·3 volts. New types include GEX36, a mixer diode and telephony modulator for use at higher voltage than the GEX64 and is available in groups matched for forward current at 5μA in voltage range 0·675 to 0·875 V. There is also a completely new group of diodes, the GEX54 group.

Graphic Recorder

NEW graphic recording instruments produced by the RECORD ELECTRICAL CO. LTD., Broadheath, Altrincham, Cheshire, are characterised by great sensitivity, efficient damping, sustained accuracy, high torque, low consumption and compactness. The overall size of the recorder is only 7·3 in.×5·6 in.×9·45 in. total depth, whilst the flush mounting pattern requires a hole in the panel only 5·25 in.×6·4 in. and thus occupies approximately only ¼ square foot. Covering a full range of requirements for ammeters, voltmeters, wattmeters, frequencymeters and tachometers these instruments are of the continuous roll chart pattern giving a month's record at 1 in. per hour. Panel space has been saved without sacrificing the amount of chart visible at any time by mounting the clock mechanisms directly in front of the electrical movement. When access to the movement is required the clock mechanism is readily removable as a complete unit.

Oven for Industrial Use

FOR close temperature control in industrial ovens, the use of forced air circulation is often advised. One such oven, manufactured by HEDIN LTD., Commerce Estate, South Woodford, E.18, is available in a range of sizes from 5,800 cub in. capacity with an element rating of 1,000/1,500 W to 25,900 cub ins. rated at 3,500/400 W. For use on either 200/250 V single phase or 380/440 three phase supplies, the oven is fitted with a 4-in. dial indicating controlling stated to maintain the temperature to within 1% of the setting.

Apart from a motorised unit in the base, these ovens are similar to the company's standard industrial unit, the heating unit being mounted below the oven floor. Interiors are fitted with shelf runners and finished in heat-resisting aluminium paint, the exterior being battleship grey.

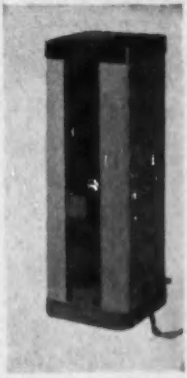
The Crossland "Raydant" Fire

SUITABLE for continuous or occasional use, the "Raydant" portable electric fire, manufactured by CROSSLANDS (RUGELEY) LTD., Cartbridge Lane, Walsall, Staffs, is of modern design to harmonise with interior furnishings of the conventional style. Its webbed side frames, finished, with the base, in cream stove enamelling, hold the chromium-plated reflector. Two models are available, one utilising one single pencil-bar type element, and the other two, a switch being fitted to the latter to isolate one when full heat is not required. Fireguards are fitted to conform with regulations, whilst all internal wiring is protected with heat resisting materials. Fitted with 6 ft of 3-core flexible cord, the list price of the 1 kW model is £2 7s. 6d. with p.t. £1 5s. 9d. extra, and of the 2 kW version £3 4s. 2d. plus an extra £1 14s. 9d. for p.t.

An Electric Coffee Mill

FROM the number of enquiries received in our service department there appears to be a large market for the Parkes Minor coffee mill which is made by ZACHARIAH PARKES LTD., 47 and 48 Hampton Street, Birmingham, 19.

This neat machine, which is finished in cream cellulose, measures 4½ in. square × 11½in. high and weighs 7 lbs. Its 1/15 h.p. universal motor (200-250 V) drives grinders of special design to give 3 ozs. ground coffee per minute an amount sufficient for approximately 2 pints of coffee. The hopper, fitted with a window, holds 1 lb of coffee beans. Feed is adjusted by a wheel control inside the hopper.



3 ozs. per minute is capacity of this mill

TRADE PUBLICATIONS

LAMPS.—The "Osram" catalogue for 1953-4 has just been published by General Electric Co. Ltd., Magnet House, Kingsway, W.C.2. Part I lists lamps for general and special lighting service. Part II shows bulbs for cars, vans, lorries, and motor cycles. Part III is concerned with photographic, projector and photoflash lamps.

LAMPS.—Recent publications from E. K. Cole Ltd., Southend-on-Sea, Essex, include a fluorescent lighting broadsheet, a throw away leaflet, a tungsten lamp catalogue, and lamp list.

RECTIFIERS.—Some of the non-standard patterns produced by Edison Swan Electric Co. Ltd. are shown in a new leaflet "Ediswan Special Rectifiers."

FLASH BULBS.—A new edition of "Perfection in a flash," the hand booklet giving full technical details of "Photoflux" flashbulbs, has just been issued by Philips Electrical Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

The WEEK in NEWS

Dollar Markets Take £220m of Goods a Month

Most Encouraging Prospects seem to be in Latin America

IT is seldom a waste of time to review past achievements in industrial development, especially as they effect exports, or to look ahead at possible future trends. Over the period 1948-52 industry has been affected to a large extent by steel shortages and the defence programme, but despite this exports have continued to rise, and not least among the successful has been the electrical industry. Exports of electrical goods and apparatus rose steadily between 1948 and 1950, fell in 1951, but picked up again last year so that the volume of exports exceeded by 13% the 1948 figure.

Dollar exports remain most important and the continued growth of the dollar markets which are now consuming about £220 million worth of goods per month is most encouraging. U.K. export trade to America has benefited recently from the high level of activity of their economy. The picture is bright in Canada, where during the past three years we have nearly trebled the value of electrical machinery shipments. This trend seems likely to improve still further, but greatest encouragement may be found in Latin America. Here an increase in our exports has been accompanied by a fall in our share of the market, due mainly to the dominance of the U.S., but these countries are developing rapidly.

S. AFRICA WILL NOT FAVOUR U.K. IMPORTS

WE hear from Pretoria, that the S. African Government has decided to end import control administration in favour of the sterling area and to allow dollar goods equal competitive facilities. The decision is to take effect from the beginning of 1954. The Finance Minister has stated that the action was made possible because of the improvement in the competitive position of British and European exporters. The U.K. would still be guaranteed a minimum earning of £50 million worth of S. African gold.

More Industry may move to N. Ireland

CONFIRMATION that N. Ireland is engaged in a drive to expand existing industries there, and to establish new ones, was given by the Minister of Commerce, Mr. W. V. McCleery, after his recent visit to London. During his short stay in London he had discussions with a number of industrialists. On his return he remarked that his talks had been most encouraging and that they were likely to lead to extensive developments in the engineering field in the near future.

FUEL EFFICIENCY COMPANY FORMED

A NEW company has been formed to advise industry on the more efficient use of fuel. An announcement to this effect was made in the House on Monday by Mr. Geoffrey Lloyd, and coincidentally the names of members of the board of directors were announced by the British Productivity Council who are sponsoring the venture. The National Industrial Fuel Efficiency Service, as it will be called, has been established as a non-profit-earning company. It follows a recommendation of the Ridley Committee.

Chairman of the new company will be Sir Leslie Hollinghurst, and prominent among the directors is Sir John Hacking. Other members nominated include Sir Patrick Dollan, Sir Edward Herbert, Mr. Leslie Jenkins, Mr. Henry Jones, Mr. E. Julian Pode, and Mr. Jack Tanner. They will extend the Ministry's present work and provide services through independent consultants and fuel technologists. There will be no Government subsidy, but finance will be provided by the N.C.B., the B.E.A. and the Gas Council.

The First Half-Century

I am afraid the influence of the Engineering Standards Committee will be sufficient to standardise the word "direct" despite the protest of those purists who point out that the correlative of 'direct' is 'indirect.' For my part I should not be sorry to swallow this little scruple since 'continuous' is inconveniently long either for speech or writing. 110, 220, 240 and 500 volts direct are the chosen standards with 600V for electric railways. In choosing these standards the committee have been influenced by the consideration that carcases built for them could be utilised for pressures 10% above or below the suggested standards by merely altering the winding, and excitation. Standard frequencies of 25 and 50 respectively, have also been adopted. A suggestion to standardise 40 or 42 for the sake of rotary converters was discussed and abandoned.—*From our issue of October* 29, 1903.

Future Trading Conditions in Syria

LATEST in the series of reviews of commercial conditions compiled by the Board of Trade deals with Syria and covers the years 1951-52. Broadly speaking, a good market already exists for various plant and equipment, especially in agriculture, and there is likely to be an increasing demand for electrical equipment for both town electrification and hydro-electric projects. There are extensive plans for development but much depends on available capital and the use of external loans.

There are two prominent hydro-electric schemes. One is the Euphrates Valley project which is estimated to cost LS.114 million. A survey has been carried out, plans and estimates drawn up, but no tenders have yet been sought. Preliminary works have already been started on the River Barada project but the major portion of it has still to be begun.

Industry in Syria has also developed in the past six years, and the Government is taking steps to encourage and control the establishment of new industries. Meanwhile during the years under review the U.K. became Syria's chief customer, and our exports continued to be of a worthwhile nature.

Electricity and Town Planning

THE apparent increased efforts to extend the use of electricity and current controversy on the choice of gas or electricity in new houses, make it important that the industry has a prominent place at the National Housing and Town Planning Exhibition, being held at the Winter Gardens, Eastbourne. That prominence has been provided most suitably by E.D.A.

A large map exemplifies wise electrical planning for a new town, and depicts the distribution mains at Crawley. It is shown that early consultation with the Electricity Board is essential, and that it costs little more to provide for a full electrical service to premises at the outset, whereas extensions at a later date involve heavy costs. Model of a house shows economical wiring while achieving plentiful supply of plugs and sockets. There is also a comprehensive display of domestic appliances.

New Cable Factory Opened at Leigh

A NEW 80,000 sq ft extension to British Insulated Callender's Cables Co.'s Anchor works at Leigh, Lancs, was officially opened by the chairman, Sir Alexander Roger, earlier this month. In his remarks at the ceremony, Sir Alexander said industry was confronted with increasing world competition in prices, and his company intended to meet the threat by modernising production facilities.

The site of the new factory is that of the former Leigh Rugby football ground in Mather Lane. It is about 350 ft long and comprises four bays. Since production began at these premises all B.I.C.C. rubber insulated cables are made at Leigh, and the new production area has been devoted to lead-covered and armoured cables for colliery, shipping and industrial uses.

SOME BELFAST TENDERS ACCEPTED

TWO of the smaller contracts offered by Belfast Corporation's Electricity Committee by public advertisement, have been placed, we heard last week. The first involves the supply and installation of cables and accessories for distribution extensions and has been awarded to W. T. Henley Telegraph Works Co., who quoted £323,864. Three firms submitted tenders. Twelve firms tendered for the supply of 1,000 kVA transformer for Shankill substation, and the contract has been awarded to Brush Electrical Engineering Co. at £13,466. Two of the three firms submitting tenders in the first case, and eleven of the 12 in the second case, quoted identical amounts, it is understood.

Tariff Inquiry Rejected

THE National Chamber of Trade is not satisfied with the Ministry's reply to their request for an inquiry into the workings of the nationalised gas and electricity boards, with particular reference to fluctuations in tariffs. The reply stated that both undertakings were obliged to avoid undue preference in framing tariffs, and any special circumstances were matters for individual area boards.

View inside B.I.C.C.'s new factory at Leigh. In the foreground a rubber insulated wire armoured cable is being served, and other cable-making machinery is being assembled

COST ACCOUNTANCY & PRODUCTIVITY

MEMBERS of three productivity teams which have visited the U.S. to study that country's methods of accountancy assembled at the Beaver Hall in London last week to discuss the theme "What makes Management Accountancy effective in the U.S.A.?" The three teams were sent under the auspices of Anglo-American, Anglo-Franco and O.E.E.C. Productivity Councils. By way of introduction it was pointed out that among the 58 Productivity Council teams who visited the States to study varying subjects, 36 were much impressed and reported on the American's belief in cost accountancy. Those on the platform were unanimous that American management was good, and it was suggested that the extensive use of accountancy was one of the primary factors for America's greater productivity. They were also agreed, however, that there was nothing new in the techniques employed, but the use made of those techniques was much better and far more extensive.

There was, in America, a much closer liaison between management and the factory floor, and the former were convinced of the vital importance of costs. It was believed that prices were fixed by competition, and consequently articles had to be made below market price. First concern of U.S. businessmen was to keep costs down, and one method of doing this was to give information on costs to all levels of management. With this in mind, the system of price rings was to be deprecated. There was a movement in this country now to spread the idea and belief in the importance of accountancy through British industry.

One member of the group which discussed this subject at last week's meeting was Mr. Ian T. Morrow, deputy managing director of Brush Electrical Engineering Co. Ltd., and leader of the Anglo-American Productivity Team on Accountancy.

No Hope for Standard Bulk Supply Tariff

A RECENT appeal for a standard bulk supply tariff by North Devon's M.P., on behalf of Barnstaple Chamber of Commerce, has been rejected by the Ministry of Fuel and Power. Fresh arguments were submitted which considered it unfair to make regional variations, especially where distribution costs were high, as in the sparsely populated south-west.

Success of English Electric's "Canberra" bomber in this month's New Zealand air race was not forgotten in the latest display of the same company's electrical domestic appliances at the Whitechapel (Liverpool) showrooms of the Merseyside and N. Wales Electricity Board

OFFICIAL PUBLICATIONS

COAL MINES. (Electricity) (Earthing Systems) General Regulations. S.I.1509. H.M.S.O. 2d. (See page 824)

COAL MINES. (Installation and Use of Electricity) (Revocation) Order 1953. S.I.1510. H.M.S.O. 2d.

M.F.P. SAFETY CIRCULAR 206. Coal Mines (Electricity) (Earthing Systems) General Regulations 1953. H.M.S.O. 2d.

BRITISH STANDARD
B.S. 1224: Electroplated Coatings of Nickel and Chromium (Revision).

FACTORY FORM 342: Precautions in Use of Ionising Radiations in Industry. H.M.S.O. 2s.

More Students Seek Experience Abroad

THERE was another advance in the number of engineering students going abroad for experience last year under the auspices of the International Association for the Exchange of Students for Technical Experience (IAESTE). During the summer vacation of 1953, a total of 3,783 students from 18 countries were given facilities for overseas studies, according to the report prepared by the General Secretary, Mr. J. Newby, of Imperial College. 544 of these travellers came from Great Britain, 84 being electrical engineering students. The total of all electrical engineering students exchanged was 600.

An attempt is being made to create a connecting link between European membership and the Near East, and also to interest Greece, Turkey and Portugal. The next Conference of the Association will be in Stockholm in January.

Y.E.B. Experiments

EXPERIMENTS are being conducted in Sheffield by the Yorkshire Electricity Board for the control of electricity supply by radio. The tests are with specially designed short-wave radio sets. This is not, of course, a new idea, but its use in this country has been limited. A similar system was installed in factories last winter to warn of load shedding.

Linesman Killed: Action against N.E. Board Fails

A WIDOW'S claim for damages against the N.E. Electricity Board following a fatal accident while an employee was repairing overhead lines, was dismissed at Northumberland Assizes recently. The linesman was killed when he fell on to some iron railings from a ladder during repair work. He was said to have been installing some new equipment on a pole. He had placed his ladder against the wires—current had been switched off on one set of wires, but another remained live. As he climbed the ladder, he overbalanced, clutched the live wire, was pulled off, but fell on to the railings which caused his death. The defence claimed that all current should have been switched off.

Giving judgment in favour of the Board, Mr. Justice Oliver said it had always been customary to take the precise action taken in this case, and had always been considered safe. It was easy to realise, he said, the inconvenience which would have been caused by switching off all the current.

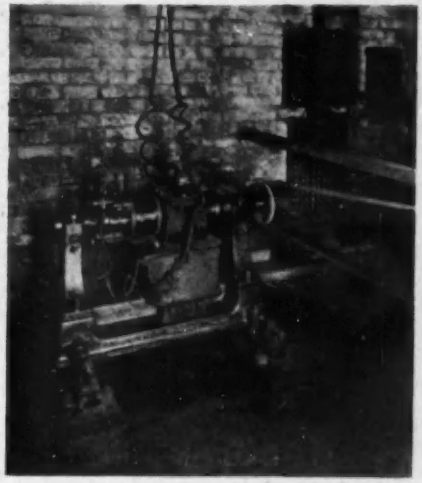
Chloride Batteries Entertain Press

OVER 200 journalists were entertained by Chloride Batteries Ltd. at the now annual Exide Press Luncheon at the opening of the Motor Show.

In proposing a toast to the Press and guests Mr. H. V. Schofield, M.C., M.I.E.E., referred to the success of the Silver Exide Battery.

The use of Porvic separators had resulted in the saving of hundreds of thousands of pounds formerly spent buying a special type of hardwood needed from North America, its only source. It had also resulted in employment for a great many people here in Britain. Annual production of Porvic was such that a line of separators corner to corner would stretch from London to New Zealand.

Last week we published a photograph of a 55-years-old motor which had just been taken out of service, but we hardly expected to get away with that without other claims. This week's illustration shows one of four motors installed in 1897 at a Midlands hospital for driving fans of a plenum heating and ventilating system. This is still running, we are told by Crompton Parkinson Ltd.



Uses of Platinum During 150 Years

TO mark the 150th anniversary of W. H. Wollaston's announcement of the discovery of the noble metal palladium, the Institute of Metallurgy held a Platinum Metals Exhibition last week at Grosvenor House. Of particular interest was the electrical section, indicating the use of platinum group metals in severe conditions and where complete reliability is essential.

Equipment demonstrated the uses of both platinum and palladium for contacts. In particular a motor uni-selector and final selector having all contacts of platinum were shown. These units and others for use in telephone systems are subjected to a heavy electrical duty under which they must maintain absolute reliability. From the latter aspect a contact used in an electrical clock system is exemplary.

Rhodium was shown to be another useful contact metal with a low, stable contact resistance. Usually it is utilised as an electro-deposited coating, in which state it has maximum hardness. Typical applications include contacts on fine detector switches, and switches handling h.f. currents where severe wear and long periods of idleness under corrosive conditions are combined.

Another electrical application was seen in the use of these metals in thermocouples for measuring temperatures up to 1700°C. Properties of high melting points and resistance to oxidation make these metals ideally suited for this purpose. A typical example in this field is the platinum to platinum-rhodium thermocouple accepted as the International Standard for temperature measurement between 630·5 and 1063°C.

In the same sphere is the platinum resistance thermometer, used to define the International Temperature scale between — 183 and 630·5°C.

TV from Crystal Palace

ORDERS for both sound and vision transmitters for the new London television station at Crystal Palace, have now been placed by the B.B.C. with Marconi's Wireless Telegraph Co. Ltd. The Crystal Palace station, which is expected to take about two years to build, will replace Alexandra Palace. The new station is to have two 15 kW vision transmitters designed for parallel operation with a combined output of 30 kW.

How Electricity 'gets Weaving'

POSSIBLY one of the most attractive publications issued by E.D.A. has just been produced with the co-operation of the N.-Western Electricity Board. It is an informative 24-page illustrated booklet entitled "Electricity in Weaving." Numerous examples are given of ways in which electricity is helping the textile industry to achieve greater output and increased efficiency. Electrically-operated broken-end detectors, electromagnetic breaking systems and electrical control equipment are all dealt with, as well as summarised information on loom drives, metering and production control; electrical installations, lighting, air conditioning and materials handling.

Some Social Activities

Thirteen not Unlucky

DESPITE any superstitions which may be attached to No. 13, the thirteenth production of the dramatic section of Johnson and Phillips' Social Club proved as popular and successful as any in the past. This year the club chose R. E. Delderfield's "Peace comes to Peckham." About 750 employees and friends, including many from neighbouring firms, enjoyed the three performances.

An E.C.A. Dinner

NORFOLK Electrical Social Committee once again organised a very successful dinner on behalf of the local branch of E.C.A. This function was an admirable opportunity for a get-together of members of the Eastern Board, the E.D.A. and contractors, in fact nearly 120 attended.

Dinner at Maidstone

OVER 100 members of the electrical industry gathered at Maidstone recently for the annual dinner of the A.S.E.E.'s Kent branch. Speeches were said to be the best for many years, and among the various topics referred to were the "guerilla" strikes, the tasks of the Association in the future and the Electrical Exhibition.

The Lord Mayor of Bristol, who became a "senior authorised person" for the occasion, switches in the new bulk supply point at Lockleaze (see our issue of last week, page 764). With him (from left to right) are Messrs. G. W. Richards (dep. sub-area manager), H. Midgley (dep. chairman), E. C. Willis (sub-area manager), P. M. Wilson (dep. sub-area manager), S. F. Steward (Board's chairman), A. C. Thirtle (div. controller) and, extreme right, C. J. Blackett (district engineer)

Renting Radiators

WE hear that a number of contractors, scattered throughout the country, are hiring out radiators for short periods to commercial premises. Mr. A. C. Hazel, managing director of Hurseal Ltd., mentioned the schemes, and expressed his enthusiasm for its extension. At present four firms are known to be operating the service—in London, Liverpool, Bradford and Southampton—but there may be others. Rents charged varied, but one agreement called for £1 per month per 1 kW radiator during the September to May period only.

Apathy Towards Engineers

SPEAKING in Glasgow last week, Mr. J. G. Orr, assistant secretary of the Engineers Guild, said there was far too much ignorance as regards engineering and the engineer. Until all engineers recognised themselves as a profession they could not expect public recognition. There was therefore every reason for the Guild to be strong, Mr. Orr asserted, reminding his audience that of a potential membership of some 60,000, it was only about 7% of what it might be. It was not enough, he added, that membership had increased by 10% in the past year.

NEWS IN BRIEF

Experiments are to be carried out at York Minster to see if the stained glass windows can be illuminated from within and made visible to people in the streets.

We hear that the West Somerset Co-operative Society is to open a new radio, TV, and electrical appliance shop at 56 Eastover, Bridgwater, shortly.

A £300,000 contract for the complete electrical equipment for two 42 in. temper mills at Steel Co. of Wales' new Velindre works, has been awarded to the G.E.C.

A new and complete range of cartons in patriotic red, white and blue has been produced by Metway Electrical Industries Ltd. for the easy transport and effective display of products.

The turbo-electric tanker "Helix" built by Swan Hunter and Wigham Richardson Ltd. for Anglo-Saxon Petroleum Co. Ltd. is claimed to be the first ship built with an electric over-the-side lift. The lift carries six people or a load of 10 cwt.

Selling price for tungsten ores of standard 65% grade and ordinary quality has been reduced. New price of Wolframite is 270s. and of Scheelite, 255s. per long ton unit delivered consumers' works, from Oct. 28.

Questions in Parliament . . .

Trade Disputes

What steps were being taken to avoid a recurrence of the "guerilla" strikes? asked Sir T. Moore last week. Mr. H. Watkinson, replying, said the best way of avoiding any disputes was the establishment of mutual confidence by the parties concerned, which would enable differences to be settled amicably. He added that the Ministry of Labour provided assistance to parties in all trade disputes and every effort would always be made to bring about settlements by conciliatory means.

Advertising Electricity

Details of the instructions given to the B.E.A. and the Gas Council in regard to promotional advertising were sought by Mr. G. Nabarro. The Minister of Fuel and Power informed him that the lines on which advertising and publicity should be conducted were fully discussed, and he was satisfied that it was best for the Boards themselves to have full responsibility. He believed they would exercise their discretion and consider the national interest.

Research Development Corporation

Details of staffing of the National Research Development Corporation at present and in the next two years were sought by Mr. D. Williams. He was told that the total staff was understood to be about 70 but there was no indication as to what that figure would be in the future. As regards finance, Mr. P. Thorneycroft said the B.O.T. was allowed to make advances up to £5 million within the first five years, and to June 1953, £480,000 had actually been advanced.

H.P. on Washing Machines

The President of the Board of Trade said last week he could not exclude electric washing machines from the Hire Purchase and Credit Sale (Agreements) Order. Mr. Vaughan-Morgan asked for this concession in view of the freeing of water heaters from the control, but the Minister pointed out that the decision on water heaters took into account the recommendations of the Ridley Committee on fuel saving, which did not apply to washing machines.

North Wales Water Scheme

There have been a number of objections raised recently to the proposal to promote a pump storage scheme and water power works at Tallylyn in N. Wales. Mr. G. Nabarro asked what application had been made concerning the scheme, but was informed that no such application had been received by the Ministry.

Air Pollution

At this time of year it was inevitable that when Parliament reassembled, one of the first questions asked concerned atmospheric pollution and London's fog. The Housing Minister suggested in one of his replies that those who burn coal should make every effort to use it efficiently and as sparingly as possible during fogs. He was asked by Mr. Dodds when an interim or final report for public information could be expected from the Air Pollution Committee, and by Mr. Nabarro as to what evidence had been taken from nationalised undertakings. The latter particularly mentioned the Transport Commission, N.C.B., and B.E.A., whom he asserted were the major contributors to smoke pollution. The Minister stated that the Committee had lost no time and he understood an interim report was to be presented within a few weeks.

Valuation for P.T.

Mr. Boyd-Carpenter stated that no decision had been reached on proposals made by the Grant Committee on Valuation for Purchase Tax. Representations were still being received from interested concerns, and the matter was still being considered, he said.

Railway Electrification

The Minister of Transport referred to the Sheffield-Manchester-Wath electrification scheme during the debate on transport last week. He said it was the first example of a completely electrified main line in this country carrying heavy freight, but also gave some completion dates. Part two of the project, which extends from Manchester to Dunford, is scheduled to be finished by next June, and the remaining section should be completed by October, 1954. The Wath-Dunford section of the line has been finished already.

Later, in his winding-up speech, the Minister said the Railway Executive had been asked to prepare a scheme for multiple-unit train sets to operate between Edinburgh and Glasgow. As regards borrowing powers, he said the Transport Commission had £108 million unused out of the authorised borrowing power of £275 million. He added that in a year or two, the House would have to be asked for legislation to increase that borrowing capacity.

Atomic Energy

The Minister of Supply told Sir Patrick Maitland on Monday that he was unable to make a statement at present on whether atomic energy could be developed for industrial uses in Scotland. Nor could he say anything regarding a site for a breeder-reactor.

Safety in Mines

Last September, 283 persons were engaged on research into safety in the mines, Mr. Joynson-Hicks stated. This compared with 195 in April 1950, 204 in 1951 and 244 in 1952. Estimated net expenditure during 1953-54 was £203,700. During the three preceding financial years expenditure was £122,781 in 1950-51, rising to £148,627 and £181,912.

Electric Supply News . . .

Belfast

Arising out of the City Council's ultimate decision to advertise for fresh tenders for certain plant for the new West power station, the Corporation's Legal Department is now considering letters from two manufacturers. One of these is from Babcock and Wilcox Ltd., whose tender for boiler plant was originally accepted by the Corporation on the recommendation of the Electricity Committee, but the contract was not signed. It seems likely that the other letter is from C. A. Parsons & Co., whose tender for 60 MW turbo-alternators was also accepted. As is well-known, the completion of the legal documents takes some considerable time, and it has become usual practice in such circumstances for the firms whose tenders have ben accepted to prepare plans, and in some case actually start work before the legal formalities are completed. The question now arises, should these firms receive compensation for work done? This is a matter which the Electricity Committee is now considering, and on which counsel's advice is being obtained, we gather.

Deptford

The first of three 52·5 MW Metropolitan-Vickers turbo-alternators scheduled for installation in extensions to Deptford East power station is expected to go into operation in December next. The second machine should be ready next February.

Eire

Work is to start as soon as possible on the construction of a coal burning generating station in the Arigna area, for the Electricity Supply Board, Mr. Lemass stated in the Dail last week. He said the Board was well advanced in its plans for this project. The estimated cost is £1,000,000.

North Eastern

Of the 1,266 villages and hamlets in the area of the North-Eastern Electricity Board, 91% were now connected to the electricity supply, the area Consultative Council have been informed. Arrangements for supplying the remaining 107 were covered by the present year's programme.

North of Scotland

The Invermoriston scheme of the North of Scotland Hydro-Electric Board, on which construction work began little more than a year ago, may set a new record for the completion of such projects. The contractors, the Mitchell Construction Co., hope to have all tunnelling operations completed by the end of this year, and the whole project of tunnels, power station and two dams, finished in about 20 months more—12 months under the time provided for by the original contract.

Rothbury

The Rural Council which has protested against capital charges imposed by the North-Eastern Electricity Board for supplying energy to farms, has received word from the Ministry of Fuel that the board was entitled to ask for these capital contributions. The Council has also received a letter from the Board stating that the revised charges recently announced for supplying electricity to farms were better, or at least as good as, those in other parts of the country. Major A. S. C. Browne, chairman of the Council, commented that recently the Board had offered to supply his farm at Callaly for £944 which had been described by the Board as a "very good proposal." Under the new terms, the supply would be available for just more than £300, it is stated.

S.W. Scotland

Small boxrooms are being unfairly included in tariff assessments by the South-West Scotland Electricity Board, it was stated at the meeting of the area Consultative Council last week, when it was agreed to ask the Board to investigate the complaint. The complaint originated from the Williamwood and District Residents' Association who maintain that the County Assessor did not recognise these boxrooms for local rating purposes as they did not come within the description of a habitable room, yet the residents had to pay 18s a year in respect of them to the Electricity Board under their tariffs. The Board have been asked for fuller information on the question of defining small rooms.

LIGHTING SCHEMES

Aberdeen.—The Watching and Lighting Committee has approved new lighting schemes for Union Terrace, part of Rosemount Viaduct, Schoolhill, Broad Street, and West North Street, estimated to cost £9,475.

Cullompton.—The Parish Council is considering a scheme for mercury-vapour lighting along the main road, at a cost of about £4,000.

Ennerdale.—The R.D.C. propose to convert street lighting from gas to electricity. Schemes have already been approved for Cleator Moor, Frizington, Moor Row and Gilgarren.

Fareham.—U.D.C. to proceed with scheme for improved lighting of the trunk road.

Longbenton U.D.C.—Ministry approval awaited for improved lighting on Great North Rd. at Seaton Burn.

Luton.—T.C. to prepare plans for lighting of Stoneygate Road and Kingsdown Avenue.

Portsmouth.—T.C. to apply for consent to borrow £11,800 for relighting Milton Road, Copnor Road, Chichester Road and Gladys Avenue, and improvements along certain other roads.

Company Activities . . .

Baghdad Light and Power Co.

There is as yet no further news on the question of nationalisation of this undertaking by the Iraqi Government. The government which originally proposed it has since resigned, and the board are now awaiting the views of the recently formed government.

Year to Dec. 31	£ Sale of Current	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	429,725	90,676	25	7	31/3	27/-
1949	487,324	111,826	32	7	32/-	29/-
1950	528,041	140,429	42	7	30/3	29/6
1951	582,863	116,776	34	7½	30/-	22/6
1952	656,067	93,328	26	7½	29/6	27/-

Bullers Ltd.

With a final dividend of 10%, the total distribution for the year ended July 15 last, amounts to 15%, the same as before. Net profit for the period, after taxation, is £89,101 (*£111,579*).

Burco Ltd.

The directors are negotiating for the purchase of the issued capital of a small group of private limited companies, it is announced. If successfully completed, the deal would be of considerable and immediate benefit to the Burco Company, the directors state. Further information may be available in a month's time, with the report on operations for the year to September 30 last.

Dorman Smith Holdings

Although the consolidated group profit before taxation showed a reduction of more than £5,000 on last year, the English companies had in fact a record year, Mr. T. Atherton, the chairman, states. As earlier anticipated, the results of the South African concern were again extremely disappointing. The reorganisation decided upon came too late to affect the figures in the 1952/53 accounts. Although it is as yet too early to forecast the final result, his latest information indicates that as regards South Africa so far the year has not been unsatisfactory.

Year to Mar. 31	£ Trading Profit	£ Net Profit	% on Ord. Earned	% on Ord. Paid
1949	84,989	22,502	17	3
1950	63,741	18,600	13	3
1951	71,271	17,756	13	3
1952	84,557	21,891	18	4½
1953	78,997	20,301	15	4½

Electric and Musical Industries

This company has suffered a sharp setback, judging by the trading results for the year ended June 30. The trading profit has dropped to £660,039 compared with £1,542,877 for the previous year. Shareholders also will get less, for the dividend has been cut by 4% to 8%. After allowing all charges, including taxation, the net profit for the year becomes £279,983 (*£402,365*). This figure is struck after transferring £220,000 (*nil*) from stock prices reserve in respect of reduced profit margins. Stock losses of £330,000 have been charged against the appropriate reserve. Last December Sir Alexander Aikman warned that a shrinkage in profit margins was expected in the group's record making business. From the foregoing results it seems likely that other branches of the concern's activities have also met difficulties.

Ever Ready (South Africa)

Trading profit for the year to June 30, 1953, is £114,880 (*£114,996*). Net profit stands at £73,247 (*£75,238*) and dividend of 1s. 3d. per 5s. share, £60,926 (*same*), as previously announced.

London Electric Wire Co. & Smiths Ltd.

It is proposed to make a one-for-one scrip bonus, for which Treasury approval has been received. This is announced along with a 5% interim Ordinary dividend on the present stock. The directors intend to capitalise reserves to the extent of £1,300,000. The new shares will rank for the final dividend for 1953.

Paterson Engineering Co. Ltd.

At £243,864 the group profit for the year year ended April 30 last is nearly £30,000 more than for the previous period, and after charging depreciation, taxation, etc., the net profit becomes £70,283 (*£67,692*). Sir William Paterson, chairman, states that the volume of orders on hand for home and export is greater than at any time before. But he warns against any justification for complacency, in view of the increasingly keen competition from abroad.

Perak River Hydro Electric Power Co.

An Ordinary dividend of 5% plus a bonus of 1% is being paid for the year ended July 31 last. The net profit for that period, after charging depreciation, is £546,617 (*£514,616*). A further £387,500 (*£381,839*) is needed for taxation, and there is £15,000 (*£75,000*) placed to general reserve and £50,000 (*nil*) to contingency reserve.

Dividends Declared

Barton and Sons.—Interim 5% (*same*) but on larger capital.

T. Clarke and Co.—Interim of 9% (*same*).

Ever Ready Co. (Great Britain).—Interim Ordinary dividend of 15% (*same*).

Ever Ready Trust Co.—Interim of 6% (*5%*).

Glenfield and Kennedy.—Interim 5% (*same*).

Hopkinsons Ltd.—Interim of 7½% (*10%*) but on increased capital.

Pressed Steel Co.—Interim of 5% (7½%) but on doubled capital.

Commercial Information

CONTRACTS OPEN

HOME

Dates given are the final for receipt of tenders, unless otherwise stated.

31 Oct.—Keynsham U.D.C. Installation in houses on Park East estate.—See Oct. 15 issue.

31 Oct.—Southam (War) R.D.C. Electrical installations in 31 houses on Rowley site. Architects, Forsyth, Lawson, Cunningham and Partners, 30 Horse Fair, Banbury, Oxon. Deposit £2 2s.

31 Oct.—Staffordshire. Applications for inclusion on approved list for electrical work. —Advertised in Oct. 15 issue.

2 Nov. — Hartley Wintney (Hants) R.D.C. Wiring 171 houses.—See Oct. 22 issue.

2 Nov.—Luton T.C. Electrical installation in Rambridge primary junior school. Borough Engineer, Town Hall. Deposit £2 2s.

3 Nov.—Barking T.C. Street lighting.—Advertised in Oct. 22 issue.

3 Nov.—Kingston-on-Hull T.C. Installation in dwellings on Longhill estate.—See Oct. 22 issue.

3 Nov.—N. Ireland. Installation in dwellings at Finaghy and Limavady.—See Oct. 22 issue.

3 Nov.—Ormskirk U.D.C. Submersible pump.—See Oct. 22 issue.

3 Nov.—Staffordshire. Supply of electric laboratory ovens, hot plate and stirrer for Central Laboratory for testing of Road Materials. T. H. Evans, clerk of county council, County Buildings, Stafford.

4 Nov.—Newcastle-on-Tyne T.C. Installation in houses on Kenton North estate.—See Oct. 15 issue.

4 Nov.—Rowley Regis T.C. Supply and erection of 14 concrete columns, lamps and equipment in class B on Portway Hill site. Borough Engineer and Surveyor, Municipal Buildings, Old Hill, Staffs. Deposit £2.

5 Nov.—Belfast. Installation in Dunkeld school.—See Oct. 22 issue.

5 Nov.—Warrington T.C. Electrical installation in various properties at Walton. Borough Surveyor, Town Hall.

6 Nov.—Belfast T.C. Water screening plant.—Advertised in Sept. 24 issue.

6 Nov.—N. Ireland. Applications for installation at Central Chest Clinic, Belfast.—See Oct. 22 issue.

7 Nov.—Ballinasloe (Eire). Installation at Mental Hospital.—See Oct. 22 issue.

7 Nov.—Ipswich T.C. Street lighting.—Advertised in Oct. 22 issue.

7 Nov.—Manchester T.C. Electrical installation in 16 police houses on three sites. Director of Housing, Town Hall. Deposit 10s. 6d.

7 Nov.—Peterborough. Lighting and power installations in 98 dwellings on Dogsthorpe North estate. Applications by above date to F. J. Smith, City Engineer and Surveyor, Town Hall. Deposit £2 2s.—Advertised in this issue.

7 Nov.—Windsor T.C. Electric supplies during 1954.—See Oct. 8 issue.

9 Nov.—Durham. Electrical installations in total of nine schools in county. Applications by above date to G. R. Clayton, County Architect, Court Lane, Durham.

9 Nov.—Hastings T.C. Electrical installation in St. Leonard's secondary school. Names by above date to Borough Engineer, 37 Wellington Sq. Deposit £2 2s.—Advertised in this issue.

9 Nov.—Royston U.D.C. Street lighting.—See Oct. 22 issue.

9 Nov.—St. Faith's and Aylsham (Norf.) R.D.C. Internal wiring of 12 houses at Horstead and Salhouse. Housing Officer, Tudor Hall, Rose Lane, Norwich.

10 Nov.—Fermanagh. Heating and power installation at Kesh primary school. Architect, H. M. Jones, 27 High St., Enniskillen.

10 Nov.—Monmouthshire T.C. Light and power installation in about 107 houses on Rockfield Rd. estate. Borough Surveyor, Council Offices.

12 Nov.—Bournemouth T.C. Electrical installation for Kinson sewage works extensions. Borough Engineer, Town Hall. Deposit £1 1s.

12 Nov.—Northwich (Chesh.) R.D.C. Pumping plant.—See Oct. 22 issue.

13 Nov.—Sheffield T.C. Electrical installation at King Edward VII grammar school extensions. J. L. Womersley, City Architect, Town Hall. Deposit £2.

14 Nov.—Macclesfield T.C. Supply and installation of 97 sodium vapour lighting units on Hurdsfield estate and 13 on Brookfield estate, all on concrete columns. J. H. Dossett, Borough Engineer, Town Hall. Deposit £2 2s. —Advertised in this issue.

14 Nov.—Preston T.C. Electrical equipment wanted for Larches Hostel for Maladjusted Children. Chief Education Officer, Municipal Buildings.

14 Nov.—Rochester T.C. Street lighting included in work on new approach road to factories at Aerodrome. City Surveyor, 66 Maidstone Rd. Deposit £2 2s.

16 Nov.—Bradford. Supply of electric lamps during 1954 for Royal Infirmary. Documents from Hospital's Supplies Officer.

18 Nov.—Wem (Salop) R.D.C. Installation in houses.—See Oct. 22 issue.

20 Nov.—Belfast T.C. Transformers for West power station. —Advertised in Oct 15 issue.

20 Nov.—Belfast T.C. 33 kV, 6·6 kV and auxiliary cables, etc., at sub-stations.—Advertised in Oct. 8 issue.

20 Nov.—Co. Kildare. Pumping plant in Ballytore water scheme. —See Oct. 8 issue.

20 Nov.—Londonderry. Installation at Ballyrashane school.—See Oct. 22 issue.

23 Nov.—Blofield and Flegg (Norf.) R.D.C. Vertical spindle borehole type pumps.—See Oct. 15 issue.

23 Nov.—Wisbech T.C. Supply and erection of 43 concrete columns, 9 steel columns, 4 wall brackets, with lanterns and mercury vapour lamps along trunk road A.47. Borough Engineer, Exchange Sq. Deposit £2 2s.

30 Nov.—Tottenham B.C. Supply of lamps during 1954-55.—See Oct. 15 issue.

4 Dec.—Belfast T.C. Overhead electric crane, switchgear, circuit-breakers, isolators and connection.—Advertised in Oct. 15 issue.

4 Dec.—Belfast T.C. Supply and erection of CO_2 fire-fighting equipment for protection of 33 kV switchgear at power station West. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s.—Advertised in this issue.

11 Dec.—Belfast T.C. Boiler units for Power Station West.—Advertised in Oct. 1 issue.

11 Dec.—Belfast T.C. Exhaust piping with valves and electrical controls for West power station.—Advertised in Oct. 15 issue.

18 Dec.—Belfast T.C. Turbo-alternators, feed heating and condensing plants sets, generator transformers, and circulating water pumps for power station West.—Advertised in Oct. 15 issue.

No date stated.—N. of Scotland H.E. Board. Submarine cable between Gighe and mainland of Kintyre, and low voltage o.h. lines.—Advertised in Oct. 15 issue.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Lacon House, Theobalds Road, W.C.1, quoting reference.*

13 Nov.—South Africa. Provincial Administration of Cape of Good Hope requires two 5-gall. water sterilisers to operate on 220/380 V a.c. supply. (F.304/53) B.o.T. (Ref.: ESB 7006/53)*.

17 Nov.—New Zealand. Tenders (P and T 150/6543) invited for supply of 2,200 fuse mountings, 25 pair, without fuses. Post and Telegraph Dept., Wellington. B.o.T. (Ref.: ESB 6748/53).*

17 Nov.—U.S.A. Supply of an indoor metal-clad switchgear assembly with bus duct, for controlling generator voltage, and a line-control, duplex type, switchboard section and synchronising panel (Ref.: D.S.-4049). Bureau of Reclamation, Denver Federal Center, Denver, Colorado. B.o.T. (Ref.: ESB 6962/53).*

20 Nov.—Belgian Congo. Supply of four diesel or petrol auxiliary generating sets of 50 kVA, and four of 30 kVA, and nine diesel generating sets of 15 kVA (Tenders No. 451). Minister of Colonies, 14 rue des Petits Carmes, Brussels. B.o.T. (Ref.: ESB 6738/53).*

24 Nov.—India. Director General of Supplies and Disposals, Shahjahan Rd., New Delhi, invite tenders (No. SE-3/RC-3766/IV) for supply of electric cables for 250 V and 660 V; various sizes and types, braided and compounded V.I.R., etc. B.o.T. (Ref.: ESB 7132/53).*

1 Dec.—New Zealand. Supply of one 10,000 kVA 110/22 kV transformer bank and spare unit for Edgecumbe sub-station. Contract No. 245. State Hydro-Electric Dept., Wellington. Documents available from N.Z. Govt. Offices in London.

2 Dec.—Egypt. Supply of 145 km l.t. cables, paper insulated, oil impregnated, lead sheathed and double armoured for laying direct in soil, 660 V, various sizes. Documents from Chief Inspecting Engineer, Egyptian Govt., 41 Tothill St., London, S.W.1, quoting ref.: 30/Elec. and Gas 3/2/574. Deposit £2 1s.—Advertised in this issue.

14 Jan.—India. Supply and erection of (a) 34 spillway radial gates with mechanism and electrical equipment, and (b) an electrically operated elevator. Documents from Director General, India Store Dept., 32-44 Edgware Rd., London, W.2, quoting ref. S.3120/53. Deposit £4 2s. 6d. per copy.

9 Feb.—New Zealand. Supply of a single-phase, double wound transformer unit, 5 MVA, 110/28·9 kV 50 c/s, outdoor type, oil immersed and natural cooled. Contract No. 249. State Hydro-Electric Dept., Wellington. B.o.T. (Ref.: ESB 7350/53).*

CONTRACTS PLACED

Barrow-in-Furness T.C. Electrical work in 119 houses on Tummerhill estate, N. Western Electricity Board, £3,821.

Haverfordwest T.C. Lighting of streets on trunk road through borough, Metropolitan-Vickers Electrical Co. Ltd., £3,383.

Leven (Fife) T.C. Installation of 140 W sodium discharge street lighting along trunk road A.915, General Electric Co. Ltd., £2,542.

Your Queries — Answered

Drink mixers, makers of? T.B.—General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. Gaskell and Chambers, Ltd., 109 Blackfriars Rd., S.E.1. H. W. Carter and Co., Ltd., 3 Duke St. House, Oxford St., W.1. Mitchell and Cooper, 8a Peckham Hill St., S.E.15. (24272)

"Paradyne" welding sets, makers of? M.I.—Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester. (24289)

Heli-strand Tools Ltd., address of? G.W.—Landgate, Rye, Sussex. (24304)

Instanta Electric Ltd., address of? T.E.—This firm was taken over by the Magnetic Controls Ltd., at the old address—48 Old Church St., S.W.3. (24317)

"Elcometer" thickness meters, makers of? T.E.—East Lancashire Chemical Co., Ltd., Fairfield 14, Manchester. (24326)

Small welding sets for joining the ends of band saws, makers of? C.A.—Holden and Hunt Ltd., Cox's Lane Works, Old Hill, Staffs. (24343)

Mercury batteries, makers of? E.B.—Mallory Batteries Ltd., Rainham Works, Rainham Rd., S. Dagenham. (24360)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWERS WANTED

Low voltage focussing spotlight—which has no name plate, makers of? J.W.—(24375)

Fan oscillating gearing and speed switches, makers of? —T.W. (24388)

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London, W.C.2.

Better Electrics, Ltd. 1451 London Rd., Norbury, S.W.16. Manufacturers of and dealers in electrical goods of all kinds, etc. Cap.: £100. Dirs.: R. Nelson-Harris and C. Gee.

Butcher Bros., Ltd. 1 Theobald Rd., Croydon, Surrey. Mechanical and electrical engineers, manufacturers of screws, nuts and bolts, etc. Cap.: £8,000. Dirs.: E. A. A. Butcher, D. A. Butcher and B. P. Butcher.

Clyne Radio Ltd., 46 Market Place, Reading, Berks. Manufacturers of and dealers in domestic, household and general electrical, radio, television and other equipment and appliances etc. Cap.: £5,000. Dirs.: to be appointed by subs. Subs.: R. Clyne and J. D. Shepard.

Crockford and Geer Ltd. Electricians, radio, television and mechanical engineers and manufacturers, etc. Cap.: £100. Dirs.: W. G. Crockford. The Thatch, Roeshot Hill, Christchurch, Hants; J. W. Richardson, 10 Old Barn Close, Christchurch, Hants.

Lighting Galleries Ltd., 199 Piccadilly, W.1. Electricians and dealers in electrical lighting equipment, fires, lampshades and electrical apparatus and goods, etc. Cap.: £100. H. Goldstein signs as Director.

Nevastane Products (Hornsey), Ltd. Cooking, heating and ventilating and general engineers, etc. Cap.: £100. Dirs.: J. E. Benham, Eastwick Hse., Gt. Bookham, and C. S. K. Benham, Hill Gate, Gt. Missenden, Bucks.

Sebley Engineering Products, Ltd. The Wandle Trading Estates, Mill Green Rd., Mitcham Junction. Manufacturers of electrical and mechanical parts and assemblies, etc. Cap.: £100. Dirs.: Elsie M. Sebbage, Elsie E. Whitley, J. P. Ryan and T. J. Sebbage.

Co. Limited by Guarantee without Share Capital.

Electrical Engineers (A.S.E.E.) Exhibition Ltd. The income and property of the Association, whencesoever derived, shall be applied solely towards the promotion of its objects. Council: J. Flood, 33 Beverley Court, W.4; S. H. Harding, 48 Claremont Rd., W.13; and 15 others.

PRICE OF CABLE METALS AND OTHER MATERIALS
(Official close at Tuesday, Oct. 27)

	£ per ton	Weekly change
COPPER, standard class A	240-242½	—5/5
,, (3 months)	225-226	—2/2
LEAD, refined pig, min. 99·97% purity	96½-96¾	+3¾/3¾
,, (3 months)	90¾-91	+1/1¼
TIN, refined, min. 99·75% purity	627-630	—½/0
,, (3 months)	606-607	+5½/—3
ALUMINIUM, ingots 99-99.5%	150 0 0	—
ZINC, virgin, min. 98% purity	75½-76	—½/½
,, (3 months)	72½-73	—½/½
RUBBER No. 1, RSS. spot (per lb.)	16½d.-16¾d.	½-1/12
,, (3 months) (per lb.)	16¾d.-16¾d.	—¾/¼
ARMOURING:		
Galv. Steel Wire (0·104 in.)	50 10 0	—
Mild Steel Tape (0·04 in.)	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

R. H. Boyland and Co., Ltd. First and final dividends of 2s. 4d. in £ payable on Nov. 18, at 100 Park St., W.1.

Caton's Metal Production Ltd. First meetings of creditors and contributories will take place at Official Receiver's office, Somerset House, 37 Temple St., Birmingham, on Nov. 3, at 11.15 a.m. and 11.45 a.m. resp.

Electrical Facilities, Ltd. Meeting of members will be held at 17 St. Helen's Place, E.C.3, on Nov. 27 at 11 a.m. to receive liquidator's report.

German Bros. (Dulverton) Ltd. Resolution for voluntary winding-up passed at meeting on Oct. 10, when L. S. Danil, C.A., 7 Hammet St., Taunton, was appointed liquidator.

Midland Holdings, Ltd. John H. Curtis of 162 Uxbridge Rd., Ealing, W.13, the liquidator, released as from Aug. 26.

Ravenscourt Electrical and Radio Co. Ltd. Last day for receiving proofs in respect of intended dividends is Nov. 13. Liquidator is C. Cantor, Ling House, 10-13 Dominion St., South Place, E.C.2.

BANKRUPTCY ACTS

First Meeting

Burnley. Hubert Scholfield, trading as Greenfield Electric Co., at 97 Deardengate, Haslingden. Meeting at Official Receiver's office, 20 Byrom St., Manchester, on Oct. 30 at 11 a.m.

Croydon. Henry H. Heckman, mechanical and electrical engineer of 32 Pollard Rd., Morden. Meeting will be at 58-61 York Terrace, Regents Park, N.W.1, tomorrow (Fri.) at 12 noon, and public examination at County Court, Scarbrook Rd., Croydon, on Dec. 17 at 10.30 a.m.

Release of Trustee

Gt. Yarmouth. Albert J. Martin, electrical engineer and wireless dealer of High St., Stalham, Norfolk. Trustee was F. R. D. Walter, Official Receiver, Castle Chambers, Opil St., Norwich.

London. Leo L. O'Connor, trading as Paragon Electrical at 27 Wellington Sq., S.W.3. Trustee was F. H. Langmaid, Official Receiver, Bankruptcy Buildings, Carey St., W.C.2.

Intended Dividends

London. Irene F. Berners and Charles J. Berners, trading as Major Manufacturing Co. at 98 Gt. Tower St., E.C. Last day for receiving proofs, Nov. 7. Trustee is F. H. Langmaid, Official Receiver, Bankruptcy Buildings, Carey St., W.C.2.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Deskfax. 721,316. Class 9. Telegraph facimile transmitting and recording apparatus. Creed and Co., Ltd., Telegraph House, Cherry Orchard Rd., Croydon.

Kenwood. 712,436. Class 7. Machines for mixing, pulping, grinding, etc. Kenwood Electrics Ltd., Kenwood Works, Ripley St., Old Woking.

Minifon. 719,784. Class 9. Apparatus and instruments for recording and reproducing sound. Minifon (Gt. Britain) Ltd., 19 Gt. Winchester St., E.C.2.

Novachrome. B716,813. Class 9. Signs. Nova Sign Co., 2 Saville Place, Newcastle-upon-Tyne.

BUSINESS PROSPECTS

HOME

Atherstone (War.) R.D.C. Erection of 78 houses on Ansley Common site. H. N. Jepson, Midland Bank Chambers, Nuneaton.

Bewdley (Worc.) T.C. Construction of 90 houses and 16 bungalows on Springhill estate. S. J. Rowe, architect, Municipal Offices, 4 Load Street.

Bridgnorth (Salop) T.C. Tenders may soon be invited for installation of electricity in council chamber and magistrates' court.

Bromley (Kent) T.C. Approval sought for construction of 78 flats at Bromley Park at cost of about £102,000.

Canterbury T.C. Construction of secondary school in London Rd. L. Hugh Wilson, city architect, Municipal Buildings.

Cardiff T.C. Municipal Art Gallery is to be built in Castle grounds, subject to approval. Estimated cost £34,000.

Crawley. Construction of 116 dwellings on Langley Green site No. 7B. Chief Architect, Broadfield, Crawley.

Cuckfield (Sussex) R.D.C. Erection of 34 dwellings at Handcross. A. Hutchings, Engineer and Surveyor, R.D.C. Offices, Boltro Rd., Haywards Heath.

Darlington T.C. Erection of proposed primary school at Firth Moor. Borough Architect, County Buildings.

Derby T.C. Erection of houses, shops and flats on various sites. Borough Architect, The Council House, Corporation Street.

Doncaster R.D.C. Ninety houses to be built at Awkley, Edenthorpe, Norton, Blaxton and Warmsworth.

Dundalk U.D.C. Erection of 26 houses at Castletown. T. G. Kenny, Town Surveyor, Town Hall.

Edinburgh. Dean of Guild Court has approved erection of primary schools in Colinton Mains Drive and Gilmerton Rd. Each estimated to cost £100,000.

Greenock. Dean of Guild Court has approved plans for extension and reconstruction of sugar refining premises in Princes St. for J. Walker and Co. (Sugar Refiners) Ltd. Estimated cost £300,000.

Hebburn-on-Tyne R.D.C. Revised plans approved for new Moulton Lane estate, providing for 136 houses, 36 bungalows and 68 flats.

Hemsworth U.D.C. Erection of 38 houses on Highfields No. 2 site. C. Earnshaw, clerk of council, Council Offices, White Hall.

Leeds T.C. Construction of 110 dwellings on Tinshill estate. City Architect, Priestley House, Quarry Hill.

Nottingham T.C. Provision of 4 new schools to serve Clifton and Bilborough has been approved. They are £187,000 Ruddington Drive secondary, £168,300 Bilborough Rd. grammar, £51,392 Whitegate Vale junior, and £40,150 Whitegate Vale infant schools.

Paisley T.C. Erection of 105 houses at Glenburn and 33 in Ferneneze Drive. Borough Engineer, 14 Gilmour Street.

Portsmouth T.C. Tenders to be invited for reconstruction of Guildhall. Quantity Surveyors are D. R. Nolans and Co., 20 John St., W.C.1. Cost estimated at £785,000.

Preston T.C. Construction of 87 houses on Brookfield estate. Borough Engineer and Surveyor, Municipal Building.

Skelton (Yorks) U.D.C. It is proposed to erect 210 houses on site of 21 acres and negotiations in hand for acquisition of another 30-acre site, also for housing.

Swansea T.C. Erection of infants' school at Chase. Borough Architect's Office, The Guildhall.

Wandsworth B.C. Erection of three 8-storey blocks of flats, two 4-storey blocks of maisonettes, and 9 houses, making total of 103 dwellings. R. H. Jerman, Town Clerk, Municipal Buildings, S.W.18.

Willenhall U.D.C. Construction of 96 houses and 12 flats on New Invention estate. R. T. Chappelle, Housing Architect, Town Hall.

Wiltshire. Erection of divisional police headquarters at Salisbury. F. I. Bowden, County Architect, County Hall, Trowbridge.

Worsley U.D.C. Erection of 30 bungalows on Algernon Rd. site. H. Lomax, Clerk of Council, Town Hall, Walkden, Manchester.

OVERSEAS

Hong Kong. A firm has written seeking an exclusive agency for electrical wires, cables and flexibles. Interested persons in this country should write: c/o The Editor, ELECTRICAL TIMES.

West Indies. H. M. Brandon and Co., Ltd., 44 Orange St., Kingston, Jamaica, wish to contact U.K. manufacturers not represented on the island, with a view to obtaining agencies for radios, electric motors, refrigerators and other electric household units.

U.S.A. Mr. W. N. Bostic, president, B.A.C. Steel Products Inc., P.O. Box 5415, Columbia, S. Carolina, wishes to import electric switch boxes, among other goods.

TRADE NOTES

Changes of Address. All departments of W. Edwards and Co. (London), Ltd., have now moved to Manor Royal, Crawley, Sussex. Telephone, Crawley 1500.

Thermodare (Gt. Britain), Ltd., have moved to new offices at 79/80 Petty France, London, S.W.1. Telephone, Abbey 1060 and 3348.

New Sales Depot. Siemens Electric Lamps and Supplies Ltd. are officially opening on November 2, a new sales depot at 8 Albion St., Leicester. Telephone, Granby 1122. Under the control of Mr. W. T. R. Yeates of the firm's Birmingham branch, the Leicester depot will be managed by Mr. N. T. Anthony.

E.W.F. L. Jones (Electrical) Ltd., Aspey's Buildings, 11 Neville St., Leeds 1, have been elected a member of the Electrical Wholesalers Federation.

Burma has introduced a new import tariff under which there are duties of 20% on flashlights, batteries and condensers, 30% on lamp bulbs, electric kettles, cookers, toasters, irons, boiling rings, and other domestic appliances, and 40% on radio sets.

Acquisition. The metal engineering firm of Goswell and Co., Alpha Rd., Teddington, has been acquired by Winston Electronics Ltd., we are informed. A new company, Winston Metal Fabrications Ltd., is being formed, to produce high precision machined piece parts, sheet metal work, etc.

MEETINGS TO NOTE

THURSDAY, OCT. 29

A.S.E.E. (Luton).—"Television: working demonstration." Co-operative Cocoa works canteen, Dallow Rd., 8 p.m.

BRIT. INSTN. OF RADIO ENGINEERS (N. Western). "The Electron Microscope." A. W. Agar. College of Technology, Manchester, 7 p.m.

INST. OF FUEL (E. Midland).—"Ridley Report, the C.U.C. and the Public." W. C. Moss. Gas Showrooms, Nottingham, 6.15 p.m.

FRIDAY, OCT. 30

INCORP. PLANT ENGRS. (Birmingham).—"Calculating Machines." G. A. Montgomerie. Imperial Hotel, 7.30 p.m.

I.E.E. (Southern).—"Transition Between Metadyne and Amplidyne Modes in d.c. Cross-field Generator." E. J. Davies. Technical College, Weymouth, 6.30 p.m.

JNR. INSTN. OF ENGINEERS (London).—Films on "Diesel Generator as Composite Heat and Power Unit," and "Rig 20," and "Introduction to Heat Engine" Townsend House, Greycoat Place, S.W.1, 7 p.m.

E.P.E.A. (Southern Meter Engrs.). "Errors, Performance and Characteristics of Induction Type Energy Meters." G. F. Shotter. Caxton Hall, Westminster, 6.30 p.m.

MONDAY, NOV. 2

I.E.E. (Mersey and N. Wales).—"Radio Telemetering." J. Walsh. Liverpool Royal Instn., Colquitt St., 6.30 p.m.

I.E.E. (N.E. Radio and Measurements).—"Transformer-Analogue Network Analysers." M. W. Humphrey Davis and G. R. Slemon. King's College, Newcastle, 6.15 p.m.

I.E.E. (S. Midland).—"Co-ordination of Insulation of h.t. Electrical Installations," by J. S. Clift; and "Electrical Discharges in Air Gaps facing Solid Insulation in h.t. Equipment," by E. Friedlander and J. R. Reed. James Watt Memorial Inst., Gt. Charles St., Birmingham, 6 p.m.

I.E.E. (Western Supply).—"Design Features of Certain British Power Stations." S. D. Whetman and A. E. Powell. S. Wales Inst. of Engineers, Park Place, Cardiff, 6 p.m.

I.E.E. (Ipswich).—"Electricity Division of National Physical Laboratory." R. S. J. Spilsbury. Crown and Anchor Hotel, 6 p.m.

I.E.E. (Maidstone).—"Electricity in Farm Crop-Drying." C. A. Cameron Brown. Wig and Gown Hotel, 7.30 p.m.

N.-EASTERN ELECTRIC CLUB.—"Electrical Engineering in Iron and Steel Works." J. Higson.

A.S.E.E. (Leeds).—Film evening. Gt. Northern Hotel, 7.30 p.m.

A.S.E.E. (N.E. London).—"Electrical Engineering as applied to Dockyards." F. W. Sheppard. Angel Hotel, Ilford, 8 p.m.

A.S.E.E. (Sheffield).—"Miniature Circuit-Breakers." H. W. Wolff. Royal Victoria Station Hotel, 7.30 p.m.

TUESDAY, NOV. 3

I.E.E. (London Measurements).—"Standardised Protective Transformers from viewpoint of Maker and User." H. S. Petch and J. G. Wellings. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (E. Midlands).—"Electricity Supply—Statistical Approach to some Particular Problems." R. B. Rowson. Loughborough College, 6.30 p.m.

I.E.E. (Cambridge Radio).—Section Chairman's address by J. A. Smale. Cambridgeshire Tech. College, 6 p.m.

I.E.E. (N. Western).—"Economic Aspects of Overhead Equipment for d.c. Railway Electrification." O. J. Crompton and G. A. Wallace. Engineers Club, Albert Sq., Manchester, 6.15 p.m.

I.E.E. (S.E. Scotland).—"Certain Aspects of Solid State Physics in Electro-photography." W. D. Oliphant. Heriot-Watt College, Edinburgh, 7 p.m.

INCORP. PLANT ENGRS. (London).—"Function of Materials Handling in Industry." L. Landon Goodman. Royal Soc. of Arts, John Adam St., Strand, 7 p.m.

A.S.E.E. (S.E. London).—"Electricity Safety." S. J. Emmerson. Congregational Church Hall, Court Rd., Eltham, 8 p.m.

A.S.E.E. (W. London).—"Back Pressure Steam Turbo Alternator Sets for Electrical Generation." D. W. de Mattos. Windsor Castle Hotel, Hamn.ersmith, 7.30 p.m.

WEDNESDAY, NOV. 4

I.E.E. (Tees-side).—"Engineering Problems associated with Integration of Undertakings in N.E. Electricity Board's Area of Supply." T. M. Ayres. Cleveland Scientific and Tech. Inst., Middlesbrough, 6.30 p.m.

I.E.E. (S.W. Scotland).—"Electrotechnical Ceramics-Compositions, Manufacturing Methods and Properties." W. G. Robinson and F. C. Bloor. 39 Elmbank Crescent, Glasgow, 7 p.m.

I.E.E. (Southern).—"High Voltage Rubber Insulated Submarine Power Cables." H. B. Slade. (Presented by L. G. Brazier). Southampton University, 6.30 p.m.

I.E.S. (Edinburgh).—"Docks and Railway Lighting." W. T. F. Souter. Manor Club, 12 Rothesay Place, 7 p.m.

I.E.S. (Newcastle).—"Shipyard Lighting." J. S. McCulloch. Roadway Hse., 8 Oxford St., 6.15 p.m.

I.E.S. (Swansea).—"Coronation Illumination, especially Colour." (Meeting with E.A.W.). Plaza Buildings, The Kingsway, 6.30 p.m.

A.S.E.E. (Preston).—"Cable Jointing." E. P. G. Thornton. Chamber of Commerce, 49a Fishergate, 7.30 p.m.

A.S.E.E. (N. London).—"Magnetic Amplifiers." Dr. Vos Smith. "Queens Head," 677 Green Lanes, Harringay, 7.45 p.m.

THURSDAY, NOV. 5

I.E.E. (London).—"Co-ordination of Insulation of h.t. Electrical Installations." Savoy Place, W.C.2, 5.30 p.m.

INST. OF FUEL (London).—"French Power Resources and their Utilisation." J. Couture. Inst. of Mechanical Engrs., Storey's Gate, 5.30 p.m.

BRIT. INSTN. OF RADIO ENGRS. (Scottish).—"Vibration Generators." H. Moore. Annual meeting. University, Edinburgh, 7 p.m.

BRIT. INSTN. OF RADIO ENGRS.—(Merseyside).—"Multi-Channel Tuners for TV." S. L. Fife and W. E. Hosey. Elect. Showrooms, Whitechapel, Liverpool, 7 p.m.

I.E.S. (Cardiff).—"Miniature Lamps and Special Applications." W. A. Kimber. Elect. Board, The Hayes, 5.45 p.m.

I.E.S. (Glasgow).—"Plant Cultivation and Artificial Light." J. B. R. Anderson. 39 Elmbank Crescent, 6.30 p.m.

I.E.S. (Glos. and Cheltenham).—"New Lamps, New Uses and Techniques." R. V. Mills. Cadena Cafe, High St., Cheltenham, 6.30 p.m.

INCORP. PLANT ENGRS. (Peterborough).—"The Heat Pump." Gas Board, Church St., 7.30 p.m.

A.S.E.E. (S. London).—"Electrical Maintenance." P. H. Usher. Cafe Royal, Croydon, 8 p.m.

FRIDAY, NOV. 6

INST. OF FUEL (Sr Wales).—"Development of Electrical Industry in S. Wales." H. J. Bennett. Royal Instn., Victoria Rd., Swansea, 6 p.m.

I.E.E. (Swansea).—Annual dinner and dance at Langland Bay Hotel.

I.E.S. (Birmingham).—"Radiation from Space." M. C. Johnson. Regent Hse., St. Phillip's Place, Colmore Row, 6 p.m.

JNR. INSTN. OF ENGINEERS (London).—"Peak Loads and Heat Storage." W. Goldstein. Alliance Hall, Palmer St., S.W.1, 7 p.m.

A.S.E.E. (Liverpool).—"Consumers' Substations." K. Helliwell and W. J. Foster. Elect. Showrooms, Whitechapel, 7.30 p.m.

MONDAY, NOV. 9

I.E.E. (London Education).—Discussion on "Requirements of Electrical Engineering Textbooks." Instr. Cdr. D. K. McCleery. Savoy Place, W.C.2, 6 p.m.

I.E.E. (Mersey and N. Wales).—Annual dinner at Exchange Hotel, Liverpool, 6.30 p.m.

I.E.E. (N. Eastern).—"Assessment of Impregnated Pressure Cable." L. G. Brazier, D. T. Hollingsworth and A. L. Williams. Neville Hall, Wesgate Rd., Newcastle, 6.15 p.m.

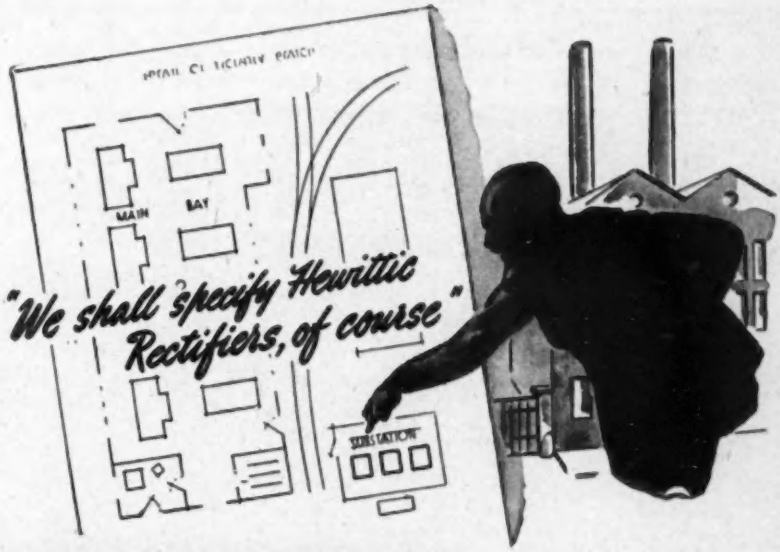
EXHIBITION DIARY

Motor Show.—Open at Earls Court, London, until Oct. 31.

Dairy Show.—Being held at Olympia, London, until Oct. 30.

Fuel Efficiency.—To be held in Manchester between Nov. 18 and 28.

Building.—To be held at Olympia, London, between Nov. 18 and Dec. 2.



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FOR D.C. supply to industrial works . . . to operate cranes and conveyors, all variable speed D.C. motor-driven machinery, magnetic equipment, electrolytic plant . . . it is obviously wise to specify converting plant that is supremely reliable, easily installed in the smallest possible space, highly economical, requires negligible maintenance and operates COMPLETELY UNATTENDED.

These requirements are fully met by HEWITTIC RECTIFIERS, which are supplied up to any capacity, for the heaviest service, e.g., operating steel rolling mills and electric traction systems, or in small units for such applications as battery charging for works electric vehicles.

Hewittic rectifiers are also ideal to replace obsolete rotary converting plant or local D.C. generating equipment, providing a greater D.C. output in the same floor space.

the *proved* plant for D.C. industrial supply

REMEMBER POPPY DAY

Send for Publication R.222

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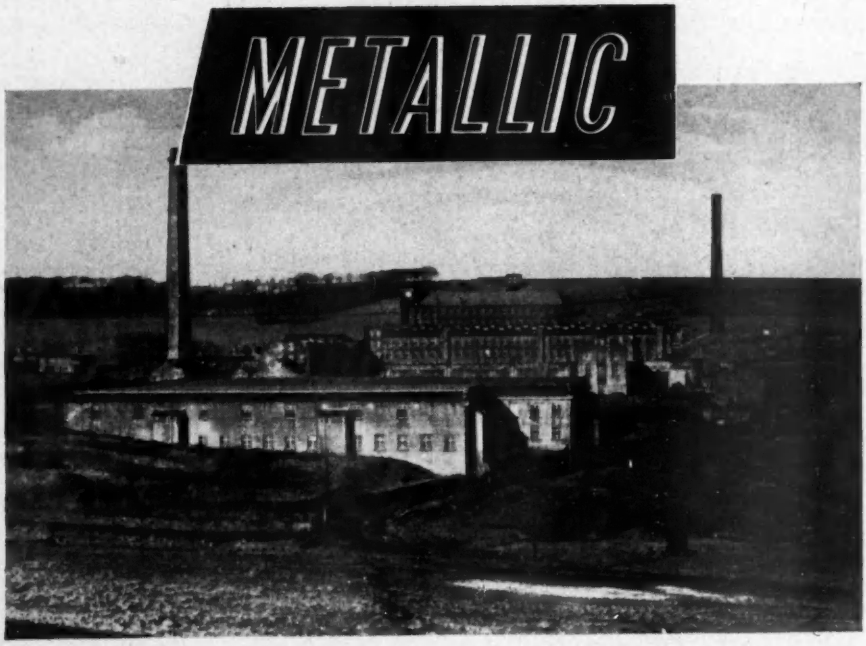

Denholme Mills, nr. Keighley
Photograph by courtesy of W. H. Foster Ltd.

Electrical Contractors for this important installation:
A. R. Farrar & Co. Ltd., Bradford

A TI COMPANY

It may be a school, it may be a factory—a power station or a housing estate, but more often than not the electrical specification will be—METALLIC.

This Yorkshire mill is no exception, being fitted throughout with METALLIC conduit and fittings—unequalled for quality and consistent accuracy.

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CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY OF BELFAST

Electricity Department

CO_2 FIRE FIGHTING EQUIPMENT

TENDERS are invited for the supply, delivery and erection at Belfast Municipal Electric Power Station West of CO_2 fire fighting equipment for the protection of 33 kV switchgear.

Form of tender (No. N.1361), conditions, specification and drawings, in quintuplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne, 1, on payment of a deposit of five guineas which will be refunded provided a bona fide tender is lodged and not withdrawn. Extra copies of the contract documents may be obtained at one guinea each; this sum will not be returnable. Cheques should be made payable to the Belfast Corporation Electricity Department.

Each tender, in quadruplicate, in sealed envelope marked "Tender for CO_2 Fire Fighting Equipment, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, December 4, 1953.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall,
Belfast.
October, 1953. (F 485)

BOROUGH OF WISBECH

STREET LIGHTING—TRUNK ROAD, A.47

TENDERS are invited for the supply and erection of 43 No. reinforced concrete lighting columns, 9 No. steel columns, 4 No. wall brackets, together with lanterns and equipment for high-pressure mercury vapour lamps.

The bills of quantities, specification and form of tender may be obtained from the Borough Engineer, Exchange Square, Wisbech, on payment of a cheque for two guineas, which will be returned on receipt of a bona fide tender. Conditions of contract and plans may be inspected at the above office.

Sealed tenders, in the envelope provided, must be delivered to the undersigned not later than twelve noon on Monday, November 23, 1953.

The Council does not bind itself to accept the lowest or any tender.

N. E. DEWICK,
Town Clerk.

Town Hall,
Wisbech, Cambs. (F 412)

EGYPTIAN GOVERNMENT

TENDERS are called for by the Director General, Cairo Electricity and Gas Administration, for the supply of 145 KILOMETRES LOW TENSION CABLES, paper insulated, oil impregnated, lead sheathed and double armoured for laying direct in soil, 660 V, various sizes.

Tenders should be submitted to The Director General, Cairo Electricity and Gas Administration, 53 Fouad El Awal Street, Cairo, Egypt, not later than 12 o'clock on December 2, 1953.

Copies of the necessary conditions of tender, specification, etc., can be obtained on application to the Chief Inspecting Engineer, Egyptian Government, 41 Tothill Street, London, S.W.1, against remittance of £2 1s. per set, which sum must be pre-paid and is not returnable. Copies of these documents are also available for scrutiny at the above address. Cheques must be endorsed permitting transfer to an Egyptian Government account.

Reference No. 30/Elec. and Gas 3/2/574 must be quoted in all correspondence. (F 456)

BOROUGH OF MACCLESFIELD

Group "B" Sodium Vapour Street Lighting

HURDSFIELD AND BROOKFIELD LANE HOUSING ESTATES

TENDERS are invited for the supply and installation of 97 sodium vapour lighting units at Hurdsfield and 13 ditto at Brookfield Lane, all mounted on reinforced concrete columns to be supplied by the contractor and erected by the Macclesfield Corporation.

Specification, bills of quantities and form of tender may be obtained from Mr. J. H. Dossett, A.M.I.C.E., Borough Engineer, Town Hall, Macclesfield, on payment of a deposit of £2 2s. to be returned on receipt of a bona fide tender.

Tenders with completed bills of quantities enclosed in plain sealed envelope, endorsed "Street Lighting, Hurdsfield and Brookfield Lane Estates," must be delivered to the undersigned not later than noon on Saturday, November 14, 1953.

The Council do not bind themselves to accept the lowest or any tender.

WALTER ISAAC,
Town Clerk.

Town Hall,
Macclesfield.
October 23, 1953. (F 494)

CITY OF PETERBOROUGH

THE Council invite tenders from recognised electrical contractors, for the electric lighting and power installations to 90 permanent houses and 8 old people's dwellings on the Dogsthorpe North Estate, Peterborough.

Drawings, specifications and forms of tender may be obtained on application to Mr. F. J. Smith, M.B.E., A.M.I.C.E., City Engineer and Surveyor, Town Hall, Peterborough.

Applications, before noon on Saturday, November 7, 1953, should be accompanied by a cheque for £2 2s., made payable to the Peterborough City Council. This will be returned on receipt of a bona fide tender or the return of the documents.

The Council does not bind itself to accept the lowest or any tender.

C. PETER CLARKE,
Town Clerk.

Town Hall,
Peterborough.
October, 1953. (F 483)

HASTINGS CORPORATION

INVITE tenders from electrical contractors for the electrical installation at the St. Leonards Secondary Modern School for 450 boys, including kitchen and gymnasium.

Names of those desiring to tender must be sent to the Borough Engineer, 37 Wellington Square, Hastings, by November 9, 1953, with a deposit of £2 2s. which will be returned only on receipt of a bona fide tender, together with all documents, etc.

Tenders on the prescribed form, sealed in the envelope provided, to be returned to the undersigned not later than a date stipulated in the tender documents, but not bearing any name or mark indicating the sender.

The Council do not bind themselves to accept the lowest or any tender.

N. P. LESTER,
Town Clerk.

Town Hall,
Hastings. (F 450)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

YORKSHIRE ELECTRICITY BOARD

No. 7 (Grimsby) Sub-Area

Scunthorpe District

CONSUMERS' ENGINEER

APPLICANTS should have passed the Graduateship Examination of the Institution of Electrical Engineers or hold equivalent technical qualifications, and should have had a sound training and experience in the work of a consumers' department in an electricity undertaking. They should have had experience in negotiations with consumers requiring electricity supplies, tariffs, sales development, electrical installation work, including preparation of specifications and tenders, and the control of staff and workpeople.

Salary: N.J.B., Class "F," Grade 8, £635-£694 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than November 12, 1953.

No. 2 (Huddersfield) Sub-Area

Huddersfield District

ASSISTANT INSTALLATION ENGINEER

Applicants should possess the Higher National Certificate in Electrical Engineering or hold equivalent qualifications and must have experience in the preparation of specifications and estimates, and generally supervising schemes for complete installations of all types.

Candidates should have a thorough knowledge of the Electricity Supply Regulations and the I.E.E. Regulations for the electrical equipment of buildings.

Salary: N.J.B., Class "G," Grade 12, £534/£555 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, not later than November 12, 1953.

No. 6 (Hull) Sub-Area

Hull District

JUNIOR ENGINEER—HORNSEA

Applicants should hold the Higher National Certificate in Electrical Engineering, or equivalent qualifications, and have had training and experience in the construction, operation and maintenance of H.V. and L.V. overhead and underground distribution systems.

The successful applicant will be required to reside in Hornsea and may be required to carry out standby duty.

Salary: N.J.B., Class "H," Grade 17/14, £402/£516 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Hull, not later than November 12, 1953.

No. 7 (Grimsby) Sub-Area

Scunthorpe District

JOINTER (E.H.T.) AND JOINTER

Applicants should have some experience of this work.

Rate of pay, 3s. 6d. and 3s. 6d. per hour respectively for a 44-hour, 5-day week. N.J.I.C. conditions of service.

Applications, giving full details of age and experience, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby. (F 463)

CITY AND COUNTY OF KINGSTON UPON HULL

City Engineer's Department

APPOINTMENT OF MECHANICAL AND/OR ELECTRICAL ASSISTANT

SALARY A.P.T. Grade 8, commencing at £760, rising by annual increments of £25 to £835 per annum.

Applications are invited for a post of Mechanical and/or Electrical Assistant.

Applicants must be chartered civil, mechanical or electrical engineers with comprehensive experience in the design of the general mechanical and electrical equipment of public buildings and public utility works. Preference will be given to candidates having specialised experience in the design of steam generating plant and installations, or in the design and operation of heavy stationary diesel and diesel electrical installations, or in the design of heavy duty pumping plant or in the design of high tension electrical sub-station and industrial control installations. Industrial experience is desirable and previous local government service not essential.

Housing accommodation will be provided for a successful married candidate if required.

Application forms may be obtained from the City Engineer, Guildhall, Kingston upon Hull, to be returned 14 days after the publication of this advertisement.

Any applicant canvassing a member of the Council or chief official will be disqualified.

WM. MORRIS, O.B.E., M.I.C.E., F.R.I.C.S.,
City Engineer.
(F 460)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPLICATIONS are invited for the following appointments:—

SHIFT CHARGE ENGINEER, Skelton Grange Power Station, Leeds. (Ultimate capacity 360 MW.)
Salary £772 to £802 per annum. Class "H," Grade 7, National Joint Board Agreement.

SHIFT CHARGE ENGINEER, Keadby Power Station, near Scunthorpe. (Ultimate capacity 360 MW.)
Salary £772 to £802 per annum. Class "H," Grade 7, National Joint Board Agreement.

SHIFT CHARGE ENGINEER Mexborough Power Station.
Salary £697 to £718 per annum. Class "F," Grade 7, National Joint Board Agreement.

Applicants for the above appointments must have had a sound technical training and experience in the operation of a modern power station, and preference will be given to candidates who are Corporate or Graduate Members of the Institution of Electrical Engineers and/or Institution of Mechanical Engineers, or who hold equivalent qualifications.

STATION SHIFT CONTROL ENGINEER, Thornhill Power Station, near Dewsbury.
Salary £908 to £930 per annum. Class "G," Grade 10, National Joint Board Agreement.

Applicants should possess the Higher National Certificate in Mechanical or Electrical Engineering or equivalent qualifications and should have experience in the operation of a modern power station.

Engineering DRAUGHTSMAN (Civil), Generation Construction Department, Commercial Street, Sheffield.
Salary £433 to £567 per annum. Grade 6, Schedule "D," National Joint Board Agreement.

Candidates should have experience in the design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., general building work associated with power station or similar construction.

Applications on Form AE6, obtainable from Divisional Secretary (Establishments), British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the date of this advertisement.

G. A. VOWLES,
Divisional Controller.
(F 470)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

Lothians Sub-Area

APPOINTMENT
SUB-AREA COMMERCIAL OFFICER

APPLICATIONS are invited for the above appointment. The salary from the date of appointment will be as established in accordance with the agreements made by the National Joint Managerial and Higher Executive Grades Committee, and will be determined provisionally in accordance with the candidate's qualifications and experience.

Applicants should have good technical qualifications. The duties include the organisation of all commercial activities in the Sub-Area, involving responsibility for the promotion of the sale and utilisation of electricity, the operation of service centres, and the control of installation contracting.

The appointment is superannuable.

Applications, stating age, present position and salary, and full details of education, qualifications and experience, should be addressed to the Manager of the Lothians' Sub-Area at High Street, Musselburgh, not later than 14 days from the publication of this advertisement. (F 399)

BRITISH ELECTRICITY AUTHORITY

South East Scotland Division

APPLICATIONS are invited for the position of SECOND ASSISTANT ENGINEER (MECHANICAL), Generation Construction Department, Divisional Headquarters.

Applicants should be experienced in the design and construction of turbo-generators, boilers, coal and ash handling plant, high pressure steam and water piping and other ancillary work.

Experience in the preparation of specifications, estimates, analysis of tenders, and a knowledge of thermodynamics and hydraulics will be a recommendation.

Preference will be given to applicants who hold a degree in Mechanical Engineering, are Corporate Members of the Institution of Mechanical Engineers, or possess equivalent qualifications.

The salary will be within Schedule "C," Class "AX/BX," Grade 2 (£834 to £997 per annum) of the National Joint Board Agreement.

Applications, stating age and experience, by Monday, November 9, 1953, to the Divisional Controller, British Electricity Authority, South East Scotland Division, British Electricity House, Portobello, Midlothian.

J. F. FIELD,
Divisional Controller.

British Electricity House,
Portobello, Midlothian.
October 17, 1953. (F 436)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the following positions in the Generation (Operation) Department. N.J.B. service conditions, superannuable appointments. Salaries within Schedule "A" of the Agreement:—

(a) ASSISTANT MAINTENANCE ENGINEER (Mechanical) at Meaford "A" Generating Station, Grade G8, commencing at £678 per annum (vacancy No. 533MD).

(b) SHIFT CHARGE ENGINEER at Stoke Generating Station, Grade E7, commencing at £649 per annum (vacancy No. 534MD).

Applicants should have received a thorough technical training and have had experience for (a) in power station mechanical maintenance and for (b) in the operation and control of steam generating plant and main switchgear, or mechanical and electrical experience in a manufacturer's works. Qualified marine engineers with electrical experience would be considered for (b). Appropriate technical qualifications an advantage.

Apply on Forms AE6, quoting vacancy number, to the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, by November 14, 1953. (F 461)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

DIVISIONAL HEADQUARTERS

SENIOR DRAUGHTSMAN (CIVIL). Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings. Higher National Certificate an advantage. Schedule "D", Grade 5 including London Allowance, commencing at £535 7s. p.a., rising annually to £704 11s. p.a.

JUNIOR ENGINEER (OPERATION DEPT.). This position is in the generation, economics and methods section of the department and applicants should preferably have a knowledge of power station plant. Higher National Certificate or equivalent would be an advantage. Class "AX," Grade 9 commencing within the range of £415 to £551 5s. p.a., including London Allowance. Applications, giving details of education, present position, experience, etc., should be received by the Establishments Officer, British Electricity House, Lower Ham Road, Kingston-upon-Thames, not later than November 7, 1953. (F 446)

SOUTHERN ELECTRICITY BOARD

COMMERCIAL ASSISTANT (SALES AND CONTRACTING)

NO. 3 (Portsmouth) Sub-Area. Salary, N.J.B., Class "J," Grade 10, Column 1 (£630 per annum). N.J.B. conditions of service.

Candidates must have had considerable experience in the control and organisation of showrooms, dealing with sales; preparation of specifications and estimates for all types of wiring and installations; experience in stores procedure; sound knowledge of tariffs, commercial statistics and records, and ability to deal with all aspects of consumer service.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham Portsmouth, and returned to him not later than Monday, November 9, 1953. (F 471)

BRITISH ELECTRICITY AUTHORITY

North Western Division

APPLICANTS are invited for the following temporary posts on the site staff of the new Fleetwood Generating Station:—

THIRD ASSISTANT ENGINEER (Electrical). Vacancy No. 236/53.

THIRD ASSISTANT ENGINEER (Mechanical). Vacancy No. 237/53.

The successful applicants will be responsible to the Resident Plant Engineer for duties in connection with the installation of the plant by contractors. The salary for each post is within the range £649 to £883 per annum (N.J.B. Grade 5, Schedule "C").

Applications, in writing, quoting vacancy number, should be sent to the Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, by November 7. (F 473)

THE ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS

maintains an EMPLOYMENT REGISTER for all supervisory and executive grades of electrical engineers and technicians.

Employers wishing to make use of this *free service* should write to the General Secretary, A.S.E.E. (Dept. ET), 54 Station Road, New Barnet, Herts. (F 351)

SOUTH EASTERN ELECTRICITY BOARD

CARTOGRAPHIC DRAUGHTSMAN,
Croydon District.

SALARY, £460 by £20 to £520 p.a., plus London Weighting under N.J.C., Grade 2. Superannuable. Applicants should be suitably qualified and have had responsible experience in a drawing office.

Applications on forms obtainable from District Managers or Senior Officers, giving two referees, must reach the District Manager, SEEBoard, Electric House, Wellesley Road, Croydon, by not later than November 9, 1953.

LINESMAN (Overhead Power),
Herne Bay/Canterbury District.

Wages 3s. 6d. per hour for 44 hours 5-day week, under N.J.I.C. agreement. Applicants should have experience in the construction and maintenance of 11 kV and l.v. overhead lines.

Applications, giving the names of two referees, must reach A. J. Hunt, Joint District Manager, Herne Bay/Canterbury District, SEEBoard, 65 Mortimer Street, Herne Bay, Kent, by November 9, 1953.

DISTRICT COMMERCIAL ENGINEER,
Reigate District.

Salary of £746 to £784 per annum under N.J.B schedule, Class "D," Grade 4. Applicants must be experienced in the organisation of installation work and be conversant with tariffs, sales and all aspects of service to domestic and commercial consumers, and have a thorough knowledge of domestic appliances.

Application forms, obtainable from C. W. Hughes, B.Sc., M.I.E.E., Surrey Manager, SEEBoard, Rough Rew, Horsham Road, Dorking, Surrey, should be returned to him with names of two referees by November 9, 1953.

A. L. BURNELL,
Secretary.
October, 1953. (F 460)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

Lanarkshire Sub-Area

APPOINTMENT OF THIRD ASSISTANT ENGINEER (OPERATION AND MAINTENANCE)

APPLICATIONS are invited from suitably qualified engineers for the appointment of Third Assistant Engineer (Operation and Maintenance) at Sub-Area Headquarters.

The salary and conditions of service will be in accordance with the National Joint Board's Agreement, Schedule "A." The present classification is Class "E," Grade 10, salary £719-£750 per annum, and is subject to the statutory deductions, including superannuation.

Applicants, who should be Graduates of the Institution of Electrical Engineers, or hold equivalent qualifications, are required to have had a sound engineering training, followed by experience in the operation and maintenance of both industrial and rural H.V. and L.V. underground and overhead distribution systems, including experience in the operation and maintenance of modern feeder and transformer protective gear. They should also be conversant with the calculation of short-circuit values, voltage drop and load flow diagrams, also H.V. and L.V. fault location methods.

The successful candidate will require to reside within a reasonable distance of the Sub-Area Offices, Hamilton.

Applications, on the official application form, which may be had from the undersigned or any other Sub-Area Manager, should be forwarded to this office within 14 days of the date of this advertisement.

DUGALD SMITH,
Manager.
137 Almada Street,
Hamilton.
October 29, 1953. (F 462)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following posts:—

(1) GENERAL ASSISTANT ENGINEERS in the system operation liaison department at Divisional Headquarters. (S.13/452)

Applicants should preferably have a Higher National Certificate (Electrical) or its equivalent and should have experience in the operation and control of interconnected power systems, or in the operation of power station plant.

Salary, N.J.B., AX/CX.8. £501-£675.

(2) BOILER HOUSE SHIFT CHARGE ENGINEER,
Earley Generating Station, Reading. (S.13/453)

Applicants should have had a sound technical training and be experienced in all branches of engineering associated with the operation of pulverised fuel fired h.p. boiler plant, and have considerable knowledge of combustion and boiler chemistry. Possession of technical qualifications admitting to corporate membership of a recognised professional institution will be a strong recommendation.

Salary, N.J.B., Grade 9, Class "G," £641-£667.

Special application forms, obtainable from F. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth, must be returned by Wednesday, November 11, 1953. (F 482)

CENTRAL ELECTRICITY BOARD, MAURITIUS

THE Board invites applications for the following appointments:

(1) GENERATION AND DISTRIBUTION ENGINEER

The post will carry responsibility for all engineering matters, including the operation of power stations and the design, layout, survey, construction and operation of h.v. and l.v. lines and sub-stations. Applicants should be between 40-45 years of age and must be fully qualified electrical engineers with administrative ability and previous experience in a public electricity supply undertaking; they must also have experience of the maintenance and operation of either diesel or hydro electric generating plant. The salary applicable to the post is Rs.17,000 rising to Rs.20,000 per annum by annual increments of Rs.500. (Rupee, 1s. 6d.)

(2) COMMERCIAL OFFICER

The post will carry responsibility for all commercial matters relating to the supply of electricity to consumers, including correspondence quotations, negotiations for special agreements, etc. Applicants should be between 35-40 years of age, must have had extensive commercial experience in a public electricity supply undertaking and be capable of building up an active sales organisation; they should also be familiar with the framing and application of tariffs and the keeping of consumers' records and statistics. The salary applicable to the post is Rs.15,000 per annum, rising by annual increments of Rs.500 to Rs.18,000.

The above appointments, which are pensionable, would be for a period of four years in the first instance. Local leave would be two weeks each year with leave of five months at the end of the tour. Free first class passages are provided for the officer and wife and a maximum of two children. No house is provided, but every effort will be made to assist the officers to find accommodation.

Applications, giving full details of age, experience, etc., and supported by two testimonials should be forwarded to Messrs. Preece, Cardew & Rider, 8-10 Queen Anne's Gate, London S.W.1. (F 481)

LONDON ELECTRICITY BOARD

ASSISTANT COMMERCIAL ENGINEER

APPLICATIONS are invited for the above position in the Woolwich District of the South Eastern Sub-Area.

The successful candidate will be required to assist the District Commercial Engineer with the commercial organisation and development of the district. Applicants should have had practical experience in: Consumer service; commercial development of electricity supply (including experience in the operation of an electrical contracting and maintenance section); control of service centres, sales and staff (including experience in the administration and operation of hire and hire-purchase schemes).

The post is graded under Schedule "A" of the National Joint Board agreement as Class "F," Grade 7, £731 17s. per annum, rising to £753 18s. per annum, inclusive of London allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed not later than November 9, 1953. Please enclose addressed envelope and quote Ref. V/1659/T. on envelope and all correspondence. (F 479)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

Lothians Sub-Area

APPLICATIONS are invited for the post of SECOND ASSISTANT ENGINEER (Meters) at Sub-Area Headquarters. Applicants should be corporate members of the Institution of Electrical Engineers or have passed the qualifying examination and should have had wide experience in the operation of an electricity supply undertaking's meter test department handling all classes of meters and metering equipment.

Salary will be in accordance with the N.J.B. Agreement, Class "G," Grade 7, £727-£758, with superannuation.

Applications stating age, education and qualifications and giving full details of experience should be addressed to Manager, South East Scotland Electricity Board, Lothians Sub-Area, Musselburgh, Midlothian, to be received not later than Monday, November 16, 1953. (F 472)

BERMUDA ELECTRIC LIGHT CO. LTD.

DISTRIBUTION ENGINEER

APPLICATIONS are invited from fully qualified Electrical Engineers to fill the post of Distribution Engineer. Candidates should preferably be between the ages of 32 and 40 years, and should be chartered electrical engineers or hold equivalent qualifications. The Distribution Engineer is deputy to the Chief Electrical Engineer and should be qualified to succeed to the higher post within a few years. A knowledge of central station practice will be a strong recommendation. Generous salary, fine climate, no income tax. Free passage for successful candidate and family. Three-year contract in first instance.—Apply in writing (no telephone messages received) to Mackness and Shipley, Parliament Mansions, Abbey Orchard Street, London S.W.1. (F 379)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:

DISTRICT COMMERCIAL ENGINEER,
Cannock District, Wolverhampton and District Sub-Area.

Extensive experience necessary in the industrial, agricultural and domestic aspects of commercial work, including installations, consumers' service and public lighting. Technical qualifications desirable. Salary, £903-£834 per annum (N.J.B., Grade E4).

JUNIOR ENGINEER,
Cannock District, Wolverhampton and District Sub-Area.

Applicants should have suitable technical qualifications and training in engineering duties particularly associated with electrical distribution systems. Salary, £300 per annum (N.J.B., Grade E15).

Apply, in writing, within 14 days, stating age, experience, present salary and position to Sub-Area Manager, Midlands Electricity Board, 83 Darlington Street, Wolverhampton.

GENERAL ASSISTANT DISTRICT ENGINEER,
Severn Vale District, Central Gloucestershire Sub-Area.

Experience necessary in all branches of distribution work, including operation and maintenance of high and low voltage cables and overhead lines, sub-stations, etc. Technical qualifications desirable. Salary, £555-£569 per annum. (N.J.B., Grade E10).

Apply, in writing, within 14 days, stating age, experience, present salary and position, and quoting Ref. GLOS/T/179, to Sub-Area Manager, Midlands Electricity Board, 126 London Road, Gloucester.

DEMONSTRATOR (FEMALE),
Dean Forest.

Applicants must have had a good education and should have a certificate of a recognised domestic training college and/or the E.A.W. certificate. Duties include lecture demonstrations in service centres and on consumers' premises and advice to consumers on the selection and use of electrical apparatus. Salary, £380-£470 per annum. (N.J.C., Grade 1.)

Apply, in writing, within 14 days, stating age, education, qualifications, training and experience, to District Manager, Midlands Electricity Board, Highfield Hall, Lydney, Glos.

A. STEPHENS,
Secretary.
(F 475)

EASTERN ELECTRICITY BOARD

Chilterns Sub-Area

DISTRICT COMMERCIAL ASSISTANT
Hemel Hempstead District. 63/53.N

THE duties will include the preparation of specifications and estimates for all classes of work and advising consumers on utilisation including farm supplies. The successful candidate may be required to work in neighbouring districts.

The salary will be in accordance with Grade 3 (£520 by £20 to £580) of the National Joint Council Salary Agreement and future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, by letter, stating age, education, qualifications and experience with details of present appointment and salary, should be submitted to the District Manager, Hemel Hempstead, Eastern Electricity Board, Marlowes, Hemel Hempstead, Herts, within 14 days of the appearance of this advertisement. (F 476)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the post of:

SHIFT CHARGE ENGINEER
Peterborough Generating Station

Salary: Class "F," Grade 7, £697-£718 per annum.

Applicants should have served an apprenticeship and obtained a Higher National Certificate in Electrical and/or Mechanical Engineering or equivalent, and possess experience in the operation of generating stations.

Apply by November 14, 1953, giving age and details of qualifications and experience, to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14.

W. N. C. CLINCH,
Controller.
(F 469)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 241/53. SHIFT CHARGE ENGINEER, Barrow Generating Station. Salary £633 to £643 (D.7). Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, East Didsbury, Manchester 20, before November 7. (F 474)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division.

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department. Vacancy No. 22/53.

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department. Vacancy No. 44/53.

Senior draughtsmen are required in the Mechanical Section of the Construction Department at North Wilford Power Station. Candidates should have experience in one or more of the following:—

1. Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.

2. H.P. and L.P. steam and feed pipework. Condensing plant and feed heating systems.

3. Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement Grade 5 (£567 to £671 per annum) and Grade 6 (£433 to £567 per annum) of Schedule "D" according to experience.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department. Vacancy No. 61/53.

Candidates should have experience in the preparation of layouts and diagrams for the installation of E.H.T. and L.T. switchgear, transformers, E.H.T. and L.T. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

THIRD ASSISTANT ENGINEER (ELECTRICAL)
Generation Construction Department, Div. H.Q.
Vacancy No. 121/53.

Applicants should be fully conversant with contract procedure and have had a fundamental training in electrical engineering, including workshops, and should preferably have had experience in the manufacture, erection, maintenance and operation of switchgear, transformers, electrical auxiliaries, main and multicore cablework, and lighting and heating installations for large power stations. Preference will be given to candidates who possess a university degree or equivalent qualifications in electrical engineering.

The salary for the above appointment will be within Schedule "C" Class "AX/DX," Grade 5 (£649 to £858 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be November 12, 1953.

BOILER HOUSE SHIFT CHARGE ENGINEER
North Wilford Power Station. Vacancy No. 122/53.

Applicants should have had a sound technical training, a good general engineering experience and a knowledge of the control and operation of large pulverised fuel boilers and associated equipment. Preference will be given to candidates who are in possession of technical qualifications admitting to corporate membership of a recognised professional institution.

The salary will be in accordance with Class "K," Grade 9 (£766 to 796 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be November 12, 1953.

SECOND ASSISTANT ENGINEER (ELECTRICAL)
Generation Construction Department, Div. H.Q.
Vacancy No. 129/53.

Preference will be given to applicants who hold a degree in electrical engineering, are corporate members of the Institution of Electrical Engineers, or possess other equivalent qualifications.

Apipicants should have had experience in the design and installation of turbo-alternators, switchgear, transformers, cables and ancillary equipment up to 33 kV, and other electrical equipment associated with modern power stations.

Experience in the preparation of specifications, estimates and the analysis of tenders is essential.

The salary will be within Schedule "C," Class "AX/DX," Grade 2 (£834 to £1,053 per annum) of the National Joint Board Agreement.

The closing date for the receipt of applications will be November 12, 1953.

The above positions will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote vacancy number.

L. F. JEFFREY,
Divisional Controller. (F 477)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

ENGINEERING DRAUGHTSMAN (MECHANICAL) required in the Generation Construction Department at Headquarters, Birmingham. N.J.B. service conditions, superannuable appointment. Salary according to qualifications and experience within Schedule "D" of the Agreement, Grade 6, £433 to £567 or Grade 5, £567 to £671 p.a.

Applicants should have received a sound technical education and practical training, and should have had experience in the drawing office of a large manufacturer's works engaged on turbine, boiler plant or general engineering construction. Appropriate technical qualifications an advantage.

Apply on Forms AE6 quoting vacancy No. 535MD, available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, by November 14, 1953. (F 462)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

REQUIRE a GENERATION ENGINEER (Operation).

Candidates should preferably be Corporate Members of one or more of the recognised engineering institutions and be familiar with the operation of modern H.P. plant. The salary will be within the provisional salary range of £1,325–£1,800 p.a.

Applications, stating age, present position and salary, and giving full details of qualifications and experience, to D. Moffat, Director of Establishments, British Electricity Authority, Winsley Street, London W.1, by November 14, 1953. Quote reference AE/426. (F 453)

SIGNALS ASSISTANT INSPECTORS OF POLICE

REQUIRED by the GOVERNMENT OF KENYA for one tour of two years, extending to three years by mutual consent and with possibility of permanency. Commencing salary, etc., according to previous experience in scale £786, rising to £1,134 a year. Gratuity (at least £162 after two years' service) payable on satisfactory final completion of service. Outfit allowance £30. Uniform allowance £10 a year. Free passages. Liberal leave on full salary. Candidates aged 20-35 should be at least 5 ft 7 in. without footwear, have normal vision without glasses and be of good education. They should possess a sound knowledge of the installation and maintenance of modern low and medium powered v.h.f., static and mobile equipment, h/f transmitters and receivers, petrol generators and diesel electric sets. Previous police experience not necessary. Apply in writing to the Crown Agents, 4 Millbank, London S.W.1, stating age, name in block letters, whether married or single, full qualifications and experience and quote M1/35931/EE. (F 486)

AN attractive vacancy exists for an ambitious young SALES ENGINEER in the London area. Applicants must be experienced in the application and selling of all types of industrial electric motors. A good salary will be paid to the right man.—Write Box ET. 696, L.P.E., 110 St. Martin's Lane, W.C.2, quoting Ref. DGG. (F 457)

A SENIOR appointment is available in South America with The General Electric Co. Ltd. for a man, speaking fluent Spanish, with a sound technical background and a wide knowledge of the electrical industry. Some sales and administrative experience is essential. —Apply to the Staff Manager, The General Electric Co. Ltd., Magnet House, Kingsway, W.C.2. (F 440)

ASSISTANT METHODS PRODUCTION ENGINEER required by light engineers, London area. Applicants should have radio, television assembly line experience. Permanent position, excellent opportunities, pension scheme.—Write Box D, D.8904, A. K. Advs., 212a Shaftesbury Avenue, London W.C.2. (F 426)

CHIEF DRAUGHTSMAN required by Johnson and Phillips, Ltd., for their Australian factory at Liverpool, New South Wales (20 miles from Sydney). Good experience in either electrical control or switchgear essential. Applicant must have real administrative capacity. Excellent opportunity. Adequate salary. Temporary accommodation will be arranged.—Apply by letter to Managing Director, Johnson and Phillips, Ltd., Victoria Works, Charlton, London S.E.7. (F 402)

CITY OF MANCHESTER. City Architect's Department. Applications are invited for an ELECTRICAL ENGINEERING ASSISTANT. Salary APT Grade III £525 to £570 per annum. Further particulars and forms of application may be obtained from the City Architect, Town Hall, Manchester 2. The completed forms to be returned to the same address by Monday, November 9, 1953. Canvassing is prohibited. (F 466)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

CONTRACTS ENGINEERS required for preparation of tenders and subsequent handling of contracts for switchgear and power transformers. Applications should state age, training, qualifications, experience and salary required.—Apply to the Personnel Manager, Messrs. South Wales Switchgear, Ltd., Blackwood, Mon. (F 403)

DRAUGHTSMEN—THE ENGLISH ELECTRIC CO., LTD., have vacancies at their Liverpool works for SENIOR DRAUGHTSMEN to work on medium and large power transformers. Previous experience in this field is not essential, and men with a good knowledge of the design and detail of welded fabrications or any kind of medium mechanical equipment will be considered. Pensionable and progressive positions are offered with housing assistance.—Write, giving full details of age, qualifications, and experience to Dept., C.P.S., 336/7 Strand, W.C.2, quoting ref. 161C. (F 389)

DRAUGHTSMEN URGENTLY REQUIRED for Development Drawing Office of a modern Merseyside engineering works. Experience in design of small electrical apparatus or switchgear essential. Pension scheme. Sports and social facilities. Housing assistance will be given to successful applicants.—Write, stating age, experience and qualifications to Box ET 678, L.P.E., 110 St. Martin's Lane, London W.C.2, quoting Ref. 136. (F 404)

EXPERIENCED cable estimating CLERK required by well-known firm of electric cable manufacturers, for work in their London office.—Applications giving details of previous experience and salary required should be addressed to Box No. 3013, Electrical Times. (F 464)

FOREMAN required at a new domestic appliance reconditioning depot at Walsall, Staffs. Applicants should have considerable experience of the repair, maintenance and reconditioning of cookers and domestic appliances and of the control of skilled and semi-skilled labour. Conditions and salary: £540 per annum (Grade 2 Schedule "E") in accordance with N.J.I.C. Agreement.—Apply in writing within 14 days to Sub-Area Manager, Midlands Electricity Board, 83 Darlington Street, Wolverhampton. (F 478)

JOHNSON AND PHILLIPS invite applications for the appointment of Chief Rubber TECHNOLOGIST to fill a vacancy which will shortly be created by retirement. Applicants should hold scientific qualifications of university degree or comparable standard and must possess extensive experience in senior capacity of the design and manufacture of rubber and thermoplastic cables with intimate knowledge of materials and compounds.

The duties involve overall responsibility to the Cable Test and Research Manager for all routine technical work relating to rubber cables and materials, and for research and development.

We are prepared to pay a good salary to the right type of man and the position offers excellent pension and insurance prospects.

Applications, giving full particulars of age, education, training, experience and salary suggested, should be sent to Employment Manager, Victoria Way, Charlton, S.E.7, marked "Rubber Technologist." They will all be treated with the utmost confidence. (F 441)

JOHNSON AND PHILLIPS, LTD., require a Chief Switchgear DRAUGHTSMAN for their South African factory. Candidates must have good practical and technical training in addition to experience with leading switchgear manufacturers both in drawing and design offices. Age preferably between 30 and 40 years.—Applications in writing, giving full particulars of training, experience, age and salary required to Employment and Welfare Manager, Johnson and Phillips, Ltd., Victoria Works, Charlton, London, S.E.7. (F 440)

JOHNSON AND PHILLIPS, LTD. require a Senior Switchgear Design DRAUGHTSMAN experienced in the design of l.v. breakers and switchgear up to 30 MVA. Only men having actual design and workshop experience and accustomed to working on own initiative with the minimum of supervision should apply. Vacancy offers good opening to the right man.—Applications, giving full particulars of training and experience together with salary required, to Employment and Welfare Manager, Johnson and Phillips, Ltd., Victoria Works, Charlton, London S.E.7. (F 429)

JUNIOR TECHNICAL ASSISTANT required for Sales Department of West London instrument manufacturers. Ordinary National Certificate standard. Man having completed National Service preferred.—Write, giving particulars of education, experience and salary required. Box No. 3009, Electrical Times. (F 448)

SENIOR SUPERVISOR, leading to contracts manager, required by medium-sized London electrical contractors. Good prospects exist for qualified man who has energy and imagination. State experience, age, salary required and when available for interview if selected.—Box No. 3007, Electrical Times. (F 447)

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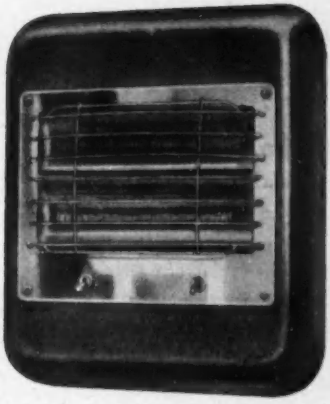

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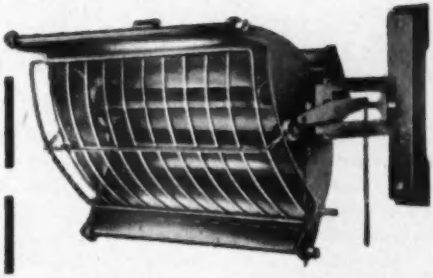

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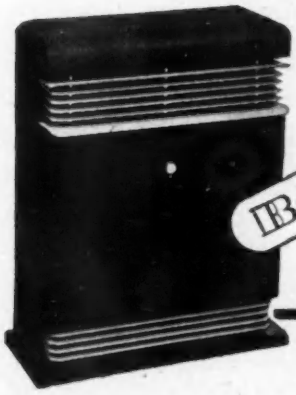

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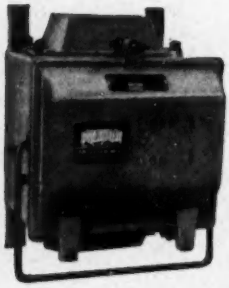

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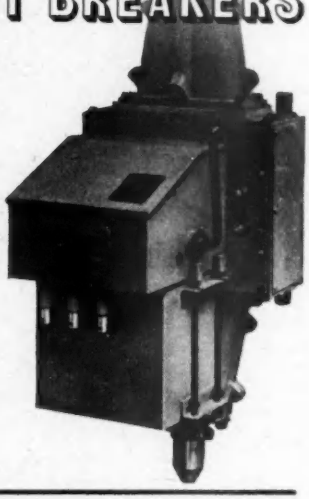

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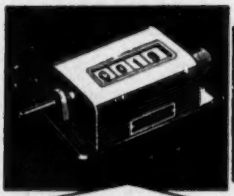

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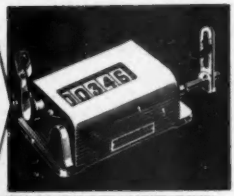

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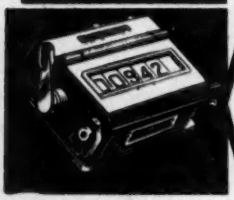

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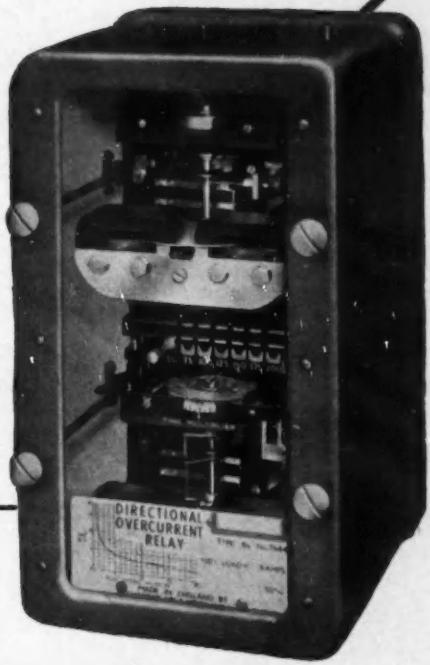

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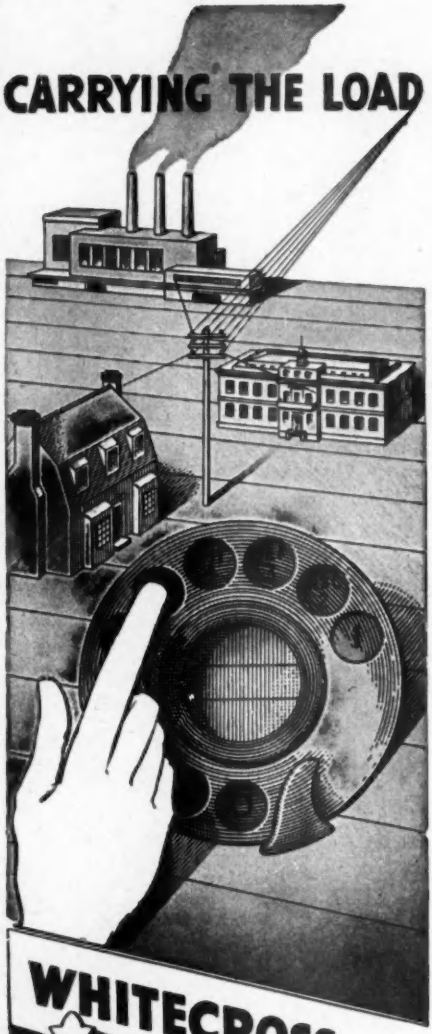

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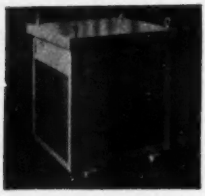

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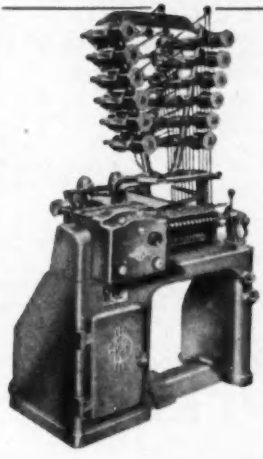

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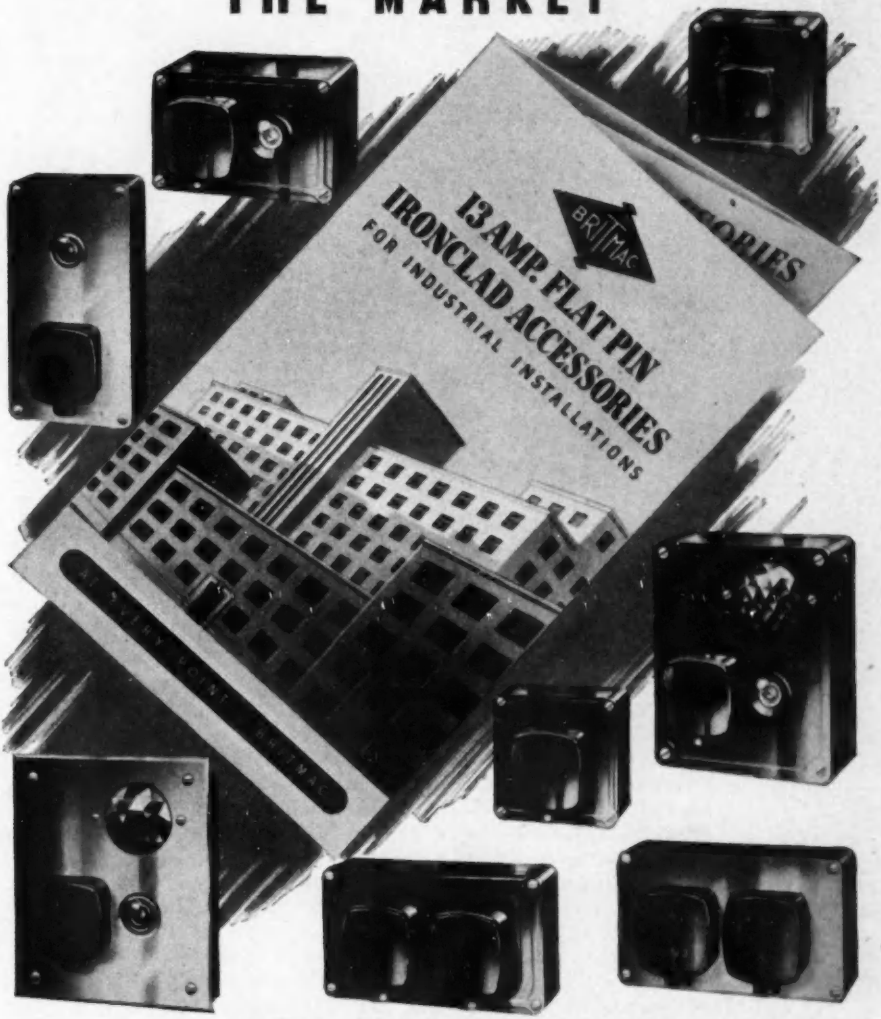

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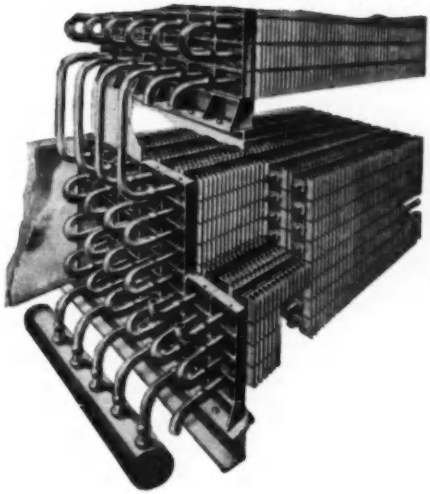

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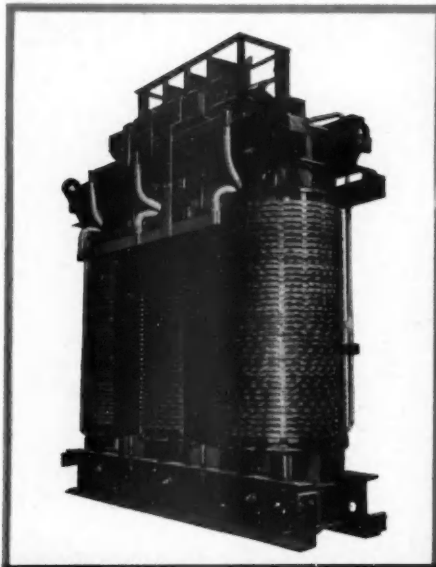

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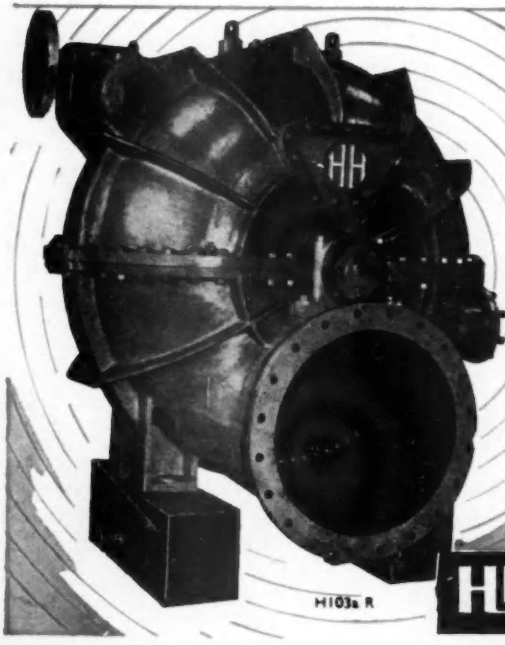

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